

EPA-542-R-93-003

Number 5

September 1993

INNOVATIVE TREATMENT TECHNOLOGIES: ANNUAL STATUS REPORT (Fifth Edition)

U.S. Environmental Protection Agency
Office of Solid Waste and Emergency Response
Technology Innovation Office
Washington, DC 20460

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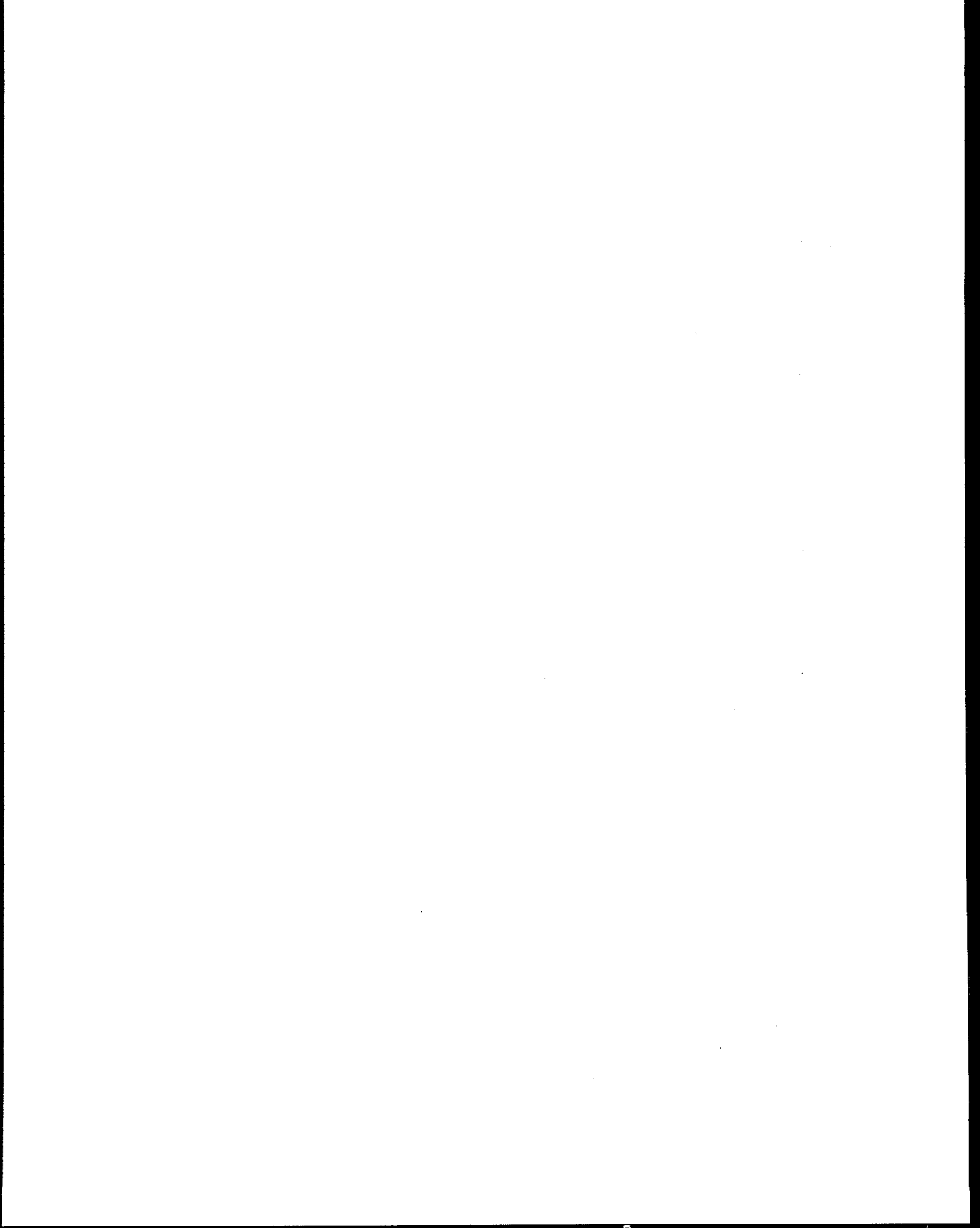
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FOREWORD

In April 1990, the U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response (OSWER) established the Technology Innovative Office (TIO) to promote the use of innovative treatment technologies for contaminated site cleanup. TIO's mission is to encourage government and industry to increase the use of innovative treatment technology to mitigate contaminated waste sites, soils and ground water. One of TIO's goals is the removal of regulatory and institutional barriers to the development and use of innovative technologies. Another is the provision of richer technology and market information to target audiences, including federal agencies, states, consulting engineering firms, responsible parties, technology developers, technology vendors and the investment community.

This report documents the status of innovative treatment technology use in the Superfund program. To a lesser extent, the report presents information on innovative treatment projects at non-Superfund sites under the jurisdiction of the Department of Defense and the Department of Energy. We have changed the format of the report this year by breaking it into three chapters presenting Superfund remedial actions, removal actions, and non-Superfund sites, respectively. We have also expanded the report to include many new innovative projects selected by EPA in fiscal year 1992 and numerous graphics and tables to assist the reader in understanding the data. We hope that this information will allow better communication between experienced technology users and those who are considering innovative technologies to clean up contaminated sites, as well as enabling technology vendors to evaluate the market for innovative treatment technologies in Superfund for the next several years.

The use of innovative treatment technologies in Superfund and other EPA waste programs is addressed by a directive, *Furthering the Use of Innovative Treatment Technologies in OSWER Programs* (OSWER Directive 9380.0-17, June 10, 1991). This directive sets forth seven initiatives to remove impediments from and create incentives for the use of innovative treatment technologies for Superfund, corrective action under the Resource Conservation and Recovery Act (RCRA), and underground storage tank cleanups. It is hoped that efforts such as the directive and this document will increase the reliance on new, less costly, or more effective technologies to address the problems associated with Superfund and other hazardous waste sites, and petroleum contamination.

Walter W. Kovalick, Jr. Ph.D.
Director, Technology Innovation Office

ACKNOWLEDGEMENTS

This document was prepared under the direction of Ms. Linda Fiedler, work assignment manager for the U.S. Environmental Protection Agency's Technology Innovation Office.

Special acknowledgement is due the Regional and state staff listed as contacts for individual sites. They provided the detailed information in this document. Their cooperation and willingness to share their knowledge and expertise on innovative treatment technologies encourages the application of those technologies at other sites.

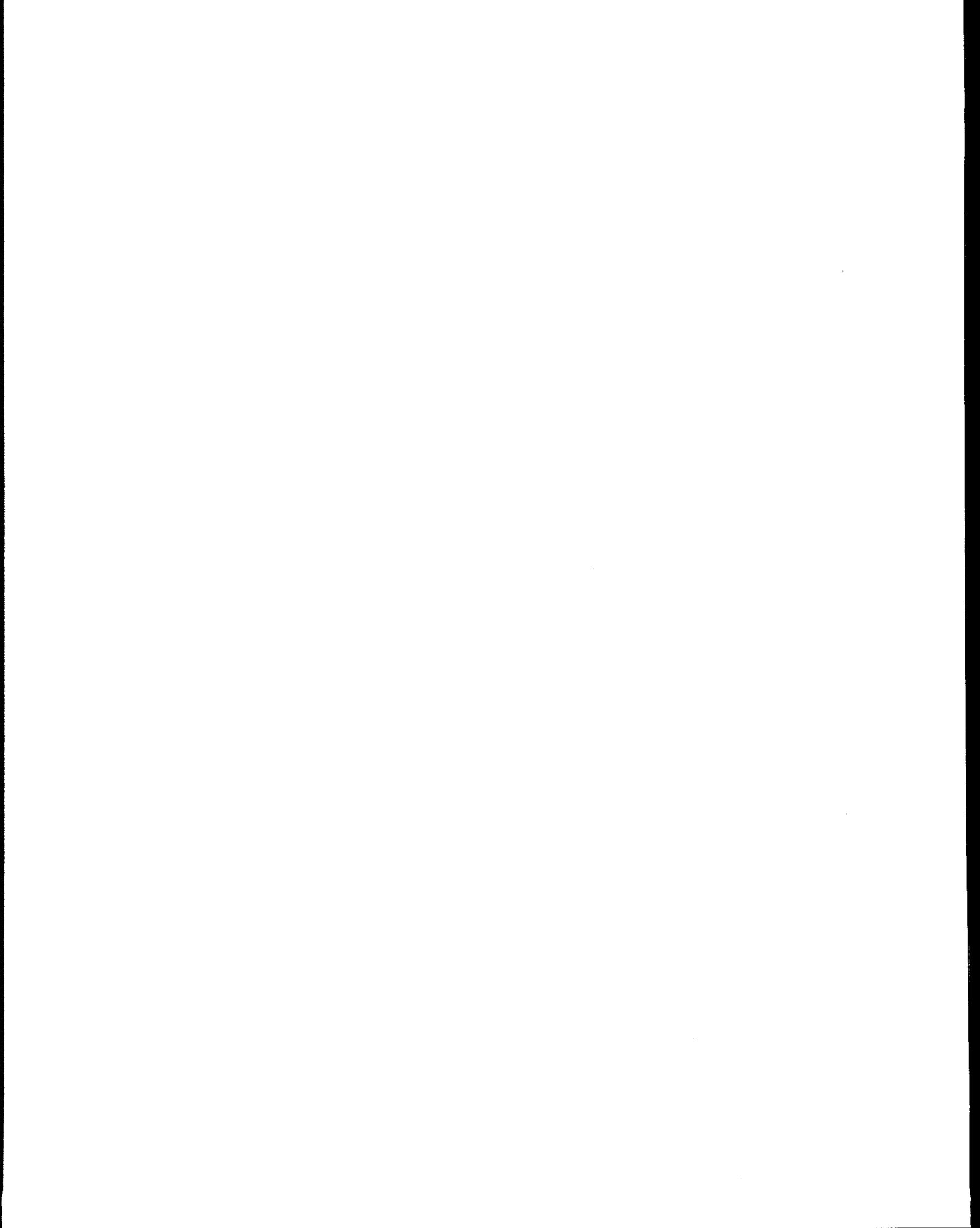
ABSTRACT

This yearly report (formerly published twice a year) documents and analyzes the selection and use of innovative treatment technologies in the U.S. EPA Superfund Program and at some non-Superfund sites under the jurisdiction of the Departments of Defense (DoD) and Energy (DOE). The status of every project has been updated, and projects selected in fiscal year 1992 Superfund Records of Decision (ROD) are included. The information will allow better communication between experienced technology users and those who are considering innovative technologies to clean up contaminated sites. In addition, the information will enable technology vendors to evaluate the market for innovative technologies in Superfund for the next several years. It also will be used by EPA's Technology Innovation Office to track progress in the application of innovative treatment technologies.

Alternative treatment technologies are alternatives to land disposal. Innovative treatment technologies are alternative treatment technologies the use of which at Superfund and similar sites is inhibited by lack of data on cost and performance. This report documents the use of the following innovative treatment technologies to treat ground water (in situ), soils, sediments, sludge, and solid-matrix wastes:

- Bioremediation (Ex Situ)
- Bioremediation (In Situ)
- Chemical treatment
- Dechlorination
- In situ flushing
- In situ vitrification
- Soil vapor extraction
- Soil washing
- Solvent extraction
- Thermal desorption
- Other technologies (air sparging, contained recovery of oil wastes, limestone barriers and fuming gasification)

The document includes information on 263 applications of innovative treatment technologies for remedial actions, 33 applications for removal actions, and 28 applications under other federal programs. Chapters 1, 2, and 3 contain detailed, site-specific information for Superfund remedial and removal sites, at which innovative treatment has been selected or used. The information for these chapters was collected through analyses of RODs, review of OSWER tracking systems, and interviews with EPA regional, DoD, and DOE staff. Chapters 1, 2, and 3 also contain performance and operating data on the 14 remedial, 19 removal, and 7 non-Superfund innovative projects that have been completed.



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LIST OF ABBREVIATIONS

AM	Action Memorandum	NPL	National Priorities List
APC	Air pollution control	OERR	Office of Emergency and Remedial Response
APEG	Alkaline metal hydroxide/polyethylene glycol	OSC	On-scene coordinator
ARCS	Alternative remedial contracts strategy	OSWER	Office of Solid Waste and Emergency Response
ATTIC	Alternative Treatment Technology Information Center	OU	Operable unit
BCD	Base catalyzed dechlorination	PAH	Polynuclear aromatic hydrocarbon
BTEX	Benzene, toluene, ethylbenzene, and xylene	PCB	Polychlorinated biphenyl
BTX	Benzene, toluene, and xylene	PCE	Perchloroethylene (tetrachloroethylene)
cy	Cubic yards	PCP	Pentachlorophenol
DCA	Dichloroethane	PRP	Potentially responsible party
DCE	Dichloroethylene	RA	Remedial action
DEHP	Di(2-ethylhexyl phthalate)	RCRA	Resource Conservation and Recovery Act
DLA	Defense Logistics Agency	RD	Remedial design
DNT	Dinitrotoluene	ROD	Record of Decision
EECA	Engineering Evaluation/Cost Analysis	RPM	Remedial project manager
ESD	Explanation of significant differences	RSKERL	Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma (EPA)
FAA	Federal Aviation Administration	SARA	Superfund Amendment and Reauthorization Act of 1986
ft	Feet	SACM	Superfund Accelerated Cleanup Model
FUDS	Formerly used defense sites	SVOC	Semivolatile organic compound
FY	Fiscal year	S/S	Solidification and stabilization
gw	Ground water	TCA	Trichloroethane
IRP	Installation Restoration Program	TCE	Trichloroethylene
KPEG	Potassium hydroxide/polyethylene glycol	TIO	Technology Innovation Office
MEK	Methyl ethyl ketone	USACE	U.S. Army Corps of Engineers
MBOCA	4,4' -Methylenebis(2-chloroaniline)	USDA	U.S. Department of Agriculture
NAPL	Nonaqueous phase liquids	VOC	Volatile organic compound
NFEC	Navy Facilities Engineering Command		

OVERVIEW

Introduction

The Technology Innovation Office (TIO) of the U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response (OSWER) has prepared this *Innovative Treatment Technologies: Annual Status Report* to document the use of innovative treatment technologies to remediate both Superfund and non-Superfund sites. The report contains site-specific information on Superfund sites (both remedial and removal actions) and non-Superfund sites (sites addressed under other federal programs) at which innovative treatment technologies are being used. Site managers can use this report in evaluating cleanup alternatives. Innovative technology vendors can use it in identifying potential markets. TIO also uses the information to track progress in the application of innovative treatment technologies.

The report is now updated annually. This September 1993 issue of the report updates and expands information provided in the October 1992 report. Information added to this update includes 59 innovative treatment technologies selected for remedial actions in fiscal year (FY) 1992 Superfund records of decision (ROD)—a ROD is the decision document used to specify the way a site, or part of a site, will be remediated—and information on 3 other completed projects. The report also includes 15 additional innovative treatment technologies selected for removal actions and 6 additional applications under other federal programs.

What Are Alternative and Innovative Treatment Technologies?

Alternative treatment technologies are alternatives to land disposal. The most frequently used alternative technologies are incineration and solidification/stabilization. Innovative treatment technologies are alternative treatment technologies for which applications at Superfund and similar sites are inhibited by lack of data on performance

and cost. In general, a treatment technology is considered innovative if it has had limited full-scale application. Often, it is the application of a technology or process to soils, sediments, sludge, and solid-matrix waste (such as mining slag) that is innovative. Groundwater treatment after the water has been pumped to the surface often resembles traditional water treatment technologies; thus, in general, pump-and-treat or ex situ groundwater remedies are considered established. In situ bioremediation and other in situ treatment of groundwater, however, are considered innovative technologies.

This report documents the use of the following innovative treatment technologies to treat soils, sediments, sludge, and solid-matrix waste:

- | | |
|----------------------------|------------------------|
| • Bioremediation (Ex Situ) | • Solvent extraction |
| • Bioremediation (In Situ) | • Thermal desorption |
| • Chemical treatment | • Other technologies |
| • Dechlorination | (e.g., air sparging, |
| • In situ flushing | contained recovery of |
| • In situ vitrification | oily wastes, limestone |
| • Soil vapor extraction | barriers, and fuming |
| • Soil washing | gasification) |

In addition, the 12 remedial sites that are using in-situ bioremediation for groundwater remediation are included with the in situ bioremediation projects.

Sources of Information for This Report

EPA initially used RODs from individual sites to compile information on remedial actions and pollution reports, on-scene coordinators' reports, and the OSWER Removal Tracking System to compile data

on emergency response actions. The U.S. Army Corps of Engineers Hazardous, Toxic, Radioactive Waste (HTRW) Mandatory Center of Expertise (Omaha, Nebraska) and the *Synopses of Federal Demonstrations of Innovative Site Remediation Technologies*, Second Edition (EPA/542/B-40/003) were consulted to compile information on projects under other federal programs. EPA then verified and updated the draft information through interviews with remedial project managers (RPM) and on-scene coordinators (OSC) and other contacts for each site. The data concerning project status do not duplicate data in CERCLIS, EPA's Superfund tracking system. This report provides more detailed information specifically on the portion of the remedy pertaining to an innovative technology. In addition, information about technologies and sites identified here might differ from information found in the ROD annual reports and the RODs database. These differences are the result of design changes in the treatment trains used at sites that may or may not require official documentation (that is, a ROD amendment or an explanation of significant differences (ESD)).

Definitions of Specific Innovative Treatment Technologies

The innovative treatment technologies reported in the following chapters treat hazardous wastes in very different ways. The following paragraphs define the technologies as they are represented in this document and provide summary statistics on some of the technologies.

EX SITU BIOREMEDIATION uses microorganisms to degrade organic contaminants on excavated soil, sludge, and solids. The microorganisms break down the contaminants by using them as a food source. The end products are typically CO_2 and H_2O . Ex situ bioremediation includes slurry-phase bioremediation, in which the soils are mixed in water to form a slurry, and solid phase bioremediation, in which the soils are placed in a tank or building and tilled with water, and nutrients. Variations of the latter process are called land farming or composting.

In applications of **IN SITU BIOREMEDIATION**, nutrients and an oxygen source are pumped under pressure into the soil or aquifer through wells, or they are spread on the surface for infiltration to the contaminated material.

In **CHEMICAL TREATMENT** the contaminants are converted to less hazardous compounds through chemical reactions. The technology is most often used to reduce a contaminant (hexavalent chromium to the trivalent form) or oxidize a contaminant (cyanide, for example). Neutralization is considered an available technology and is not included in this report.

DECHLORINATION (another type of chemical treatment) results in the removal or replacement of chlorine atoms bonded to hazardous compounds.

For **IN SITU FLUSHING**, large volumes of water, at times supplemented with treatment compounds, are introduced to soil, waste, or groundwater to flush hazardous contaminants from a site. This technology is predicated on the assumption that the injected water can be isolated effectively within the aquifer and recovered.

IN SITU VITRIFICATION treats contaminated soil in place at temperatures of approximately 3000°F (1600°C). Metals are encapsulated in the glass-like structure of the melted silicate compounds. Organics may be treated by combustion.

SOIL WASHING is used for two purposes. First, the mechanical action and water (sometimes with additives) physically remove the contaminants from the soil particles. Second, agitation of the soil particles allows the smaller diameter, more highly contaminated fines to separate from the larger soil particles, thus reducing the volume of material requiring further treatment.

SOLVENT EXTRACTION operates on the principle that organic contaminants can be solubilized preferentially and removed from the waste in the correct solvent. The solvent used will vary, depending on the waste to be treated.

For THERMAL DESORPTION, the waste is heated in a controlled environment to cause organic compounds to volatilize from the waste. The operating temperature for thermal desorption is usually less than 1000°F (550°C). The volatilized contaminants usually require further control or treatment.

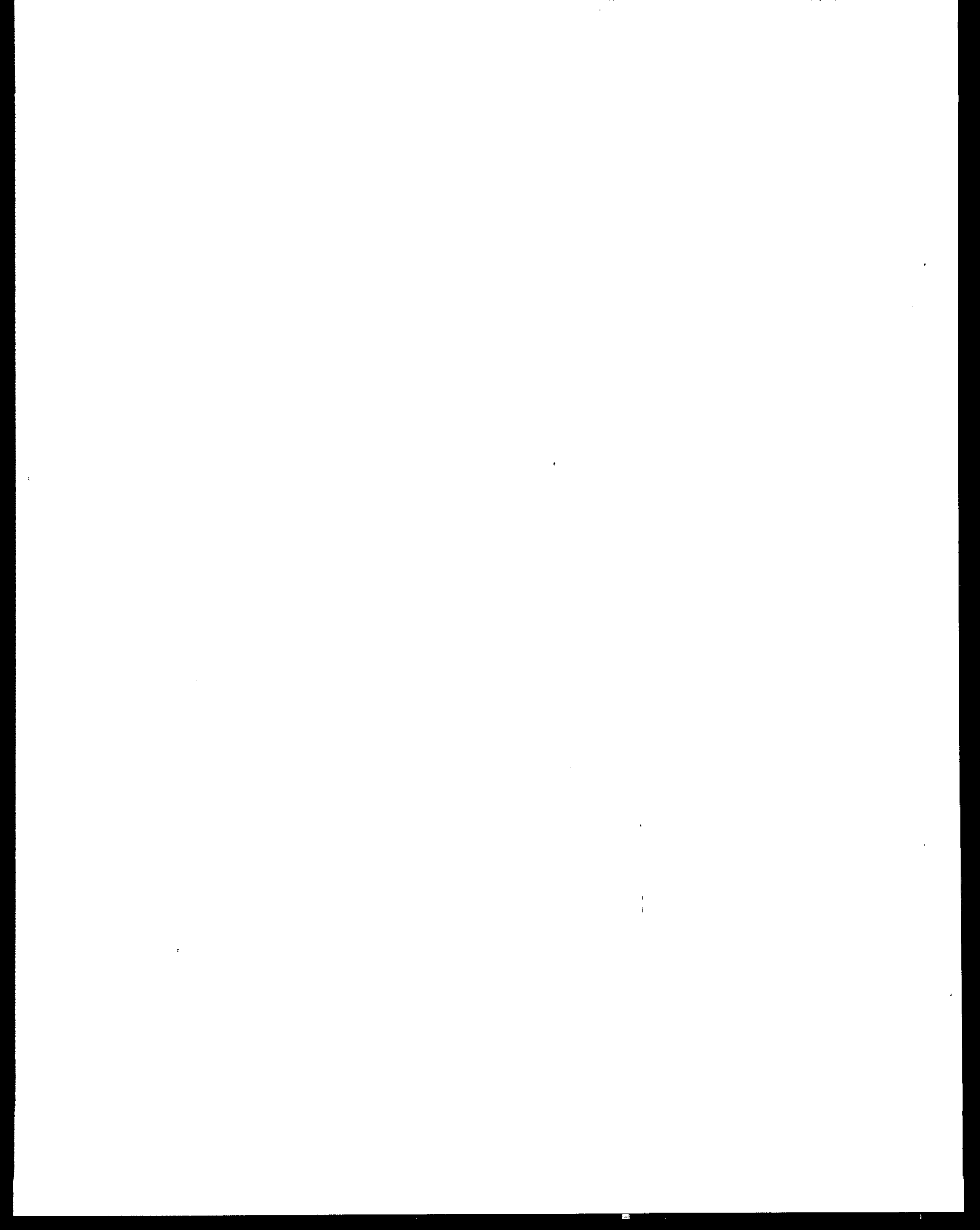
SOIL VAPOR EXTRACTION removes volatile organic constituents from the soil in place through the use of vapor extraction wells, sometimes combined with air injection wells, to strip and flush the contaminants into the air stream for further treatment.

OTHER TECHNOLOGIES include air sparging and the contained recovery of oily wastes (CROW), limestone barriers, and fuming gasification technologies. Air sparging involves injecting air into the aquifer to strip or flush volatile contaminants as the air percolates up through the groundwater and is captured by a vapor extraction

system. The CROW process displaces oil wastes with steam and hot water. The contaminated oils and groundwater are swept into a more permeable area and are pumped out of the aquifer. Limestone barriers act like chemical slurry walls. Contaminated groundwater comes into contact with the barrier and pH increases. The increase in pH effectively immobilizes dissolved metals and neutralizes the soil. Fuming gasification is a thermal treatment process that purges contaminants from solids and soils as metal fumes and organic vapors. The organic vapors can be burned as fuel and the metal fumes can be recovered and recycled.

The following chapters contain detailed information and analysis on sites at which innovative treatment technologies are being or have been applied. Chapter 1 covers all Superfund sites implementing an innovative treatment technology under a remedial action. These actions are usually documented in a ROD. Chapter 2 provides information on Superfund removal action sites. Removals are conducted in response to an immediate threat caused by a release of hazardous substances.* Chapter 3 covers non-Superfund sites or sites being addressed under other federal programs.

* Historically, remedial and removal actions operate under different procedural guidelines. The EPA currently is revising the Superfund process under the Superfund Accelerated Cleanup Model (SACM). Under SACM, EPA will adopt a continuous process for assessing site specific conditions and the need for action. Risks will be reduced quickly through early remedial or removal action.



Chapter 1

Superfund Remedial Actions

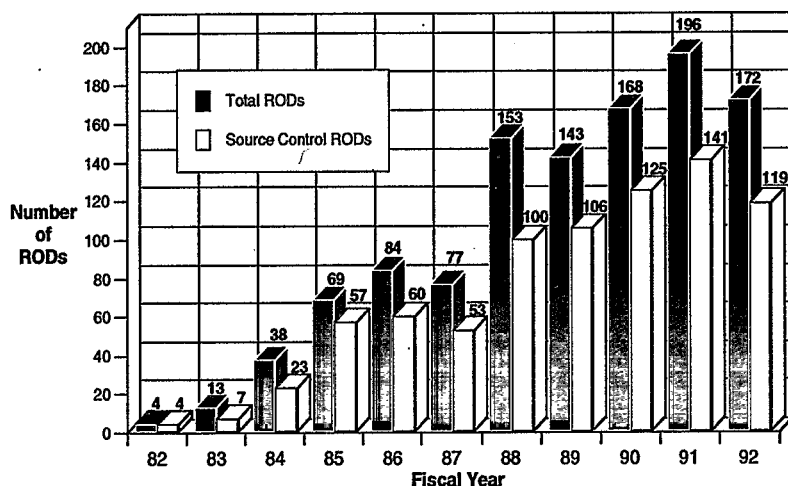
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SUPERFUND REMEDIAL ACTIONS

Frequency of Technology Selection

ROD Statistics As of September 30, 1992, EPA has listed 1,275 sites on the National Priorities List (NPL). Through Fiscal Year (FY) 1992 ending September 30, 1992, 1,117 RODs (including ROD Amendments) had been signed. Most RODs for remedial actions address the source of contamination, such as soil, sludge, sediments, solid-type wastes, and nonaqueous phase liquids (NAPL). These RODs are referred to as "source control" RODs. Other RODs address ground water only or specify that no action is necessary. Figure 1-1 shows the number of source control RODs compared with the total number of RODs for each fiscal year.

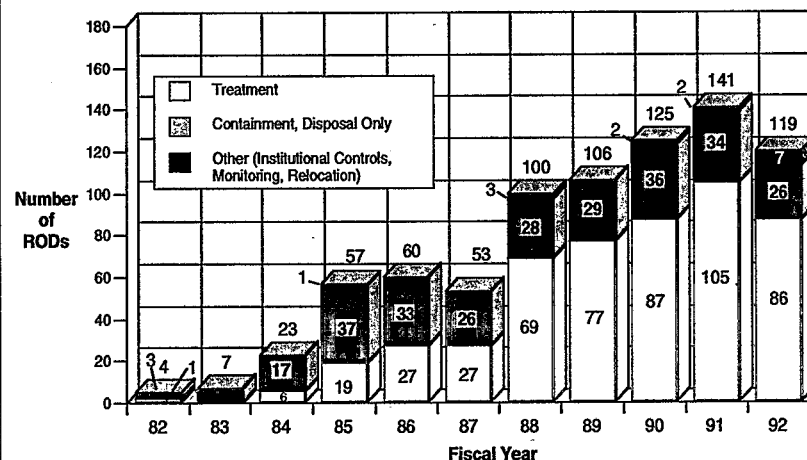
FIGURE 1-1
SUPERFUND REMEDIAL ACTIONS: RODS SIGNED BY FISCAL YEAR
(Total Number of RODs = 1,117)



The difference between the total number of RODs and the number of source control RODs is the number of "groundwater remedy only" or "no action needed" RODs.
Source: USEPA Office of Emergency and Remedial Response.

An analysis of source control RODs allows a comparison of the frequency of selection of treatment with that of selection of containment or disposal to remedy contamination at sites. Source control RODs are classified by the general type of technology selected: (1) RODs specifying some alternative treatment, (2) RODs specifying containment or disposal only, and (3) RODs specifying other action (such as land use restrictions, monitoring, or relocation). Figure 1-2 shows the number of source control RODs that fall under each category. RODs in which some treatment is selected may include containment of treatment residuals or of waste from another part of the site.

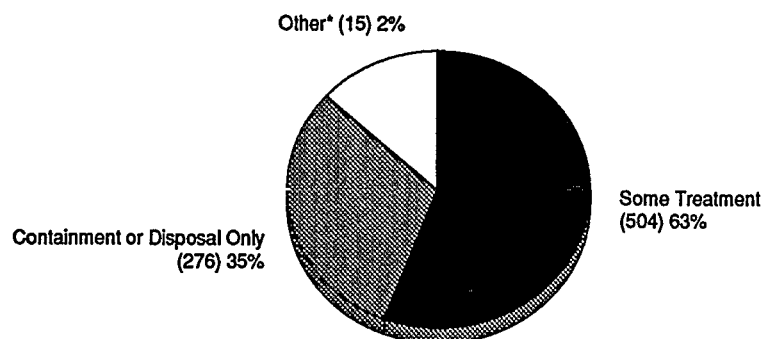
FIGURE 1-2
SUPERFUND REMEDIAL ACTIONS: SOURCE CONTROL RODS BY FISCAL YEAR



Source: USEPA Office of Emergency and Remedial Response.

Overall, 63 percent of source control RODs have selected at least one treatment technology for source control (Figure 1-3). The Superfund Amendments and Reauthorization Act of 1986 (SARA) required that EPA favor permanent remedies (that is, alternative treatment) over containment or disposal to remediate Superfund sites. In each year following the passage of SARA, more than 70 percent of the RODs contain provisions for the treatment of wastes. The increase is most

FIGURE 1-3
SUPERFUND REMEDIAL ACTIONS: OVERVIEW OF SOURCE CONTROL RODS THROUGH FISCAL YEAR 1992



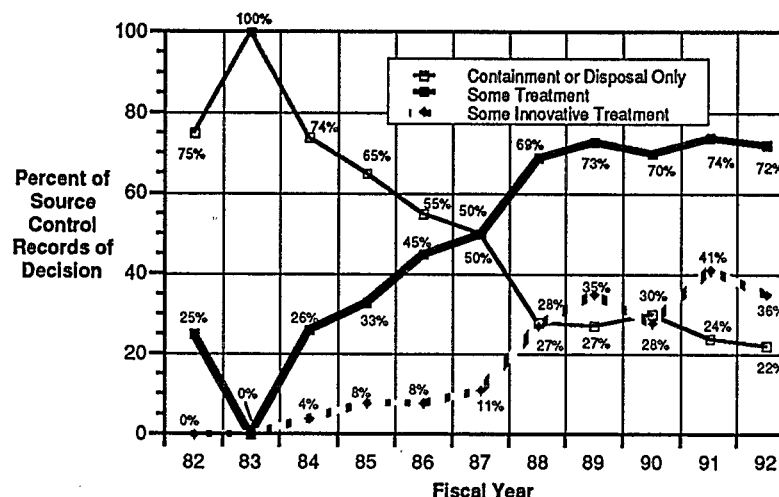
* Includes institutional controls, monitoring, and relocation.

() Number of RODs

Source: USEPA Office of Emergency and Remedial Response.

dramatic in FY1988. Fifty percent of RODs in FY 1987 selected some treatment for source control, whereas 69 percent of RODs in FY 1988 selected some treatment (Figure 1-4). The percentage was 72 percent in FY 1992. Figure 1-4 also illustrates the percentage of RODs selecting at least one *innovative technology*, as updated by current project status information. Out of a total of 795 source control RODs signed through FY 1992, innovative technologies were selected and are still being considered or used for approximately 27 percent of source control RODs. Overall, 19 percent of all RODs have included innovative technologies.

FIGURE 1-4
SUPERFUND REMEDIAL ACTIONS: TREATMENT AND DISPOSAL DECISIONS FOR SOURCE CONTROL



Source: USEPA Office of Emergency and Remedial Response

Technology Statistics Another way of illustrating the greater use of treatment is by quantifying the number and kinds of treatment technologies selected and used. Most of the remainder of the information contained in this chapter focuses on technologies, rather than RODs. In each ROD in which treatment was specified, several alternative treatment technologies may have been selected.

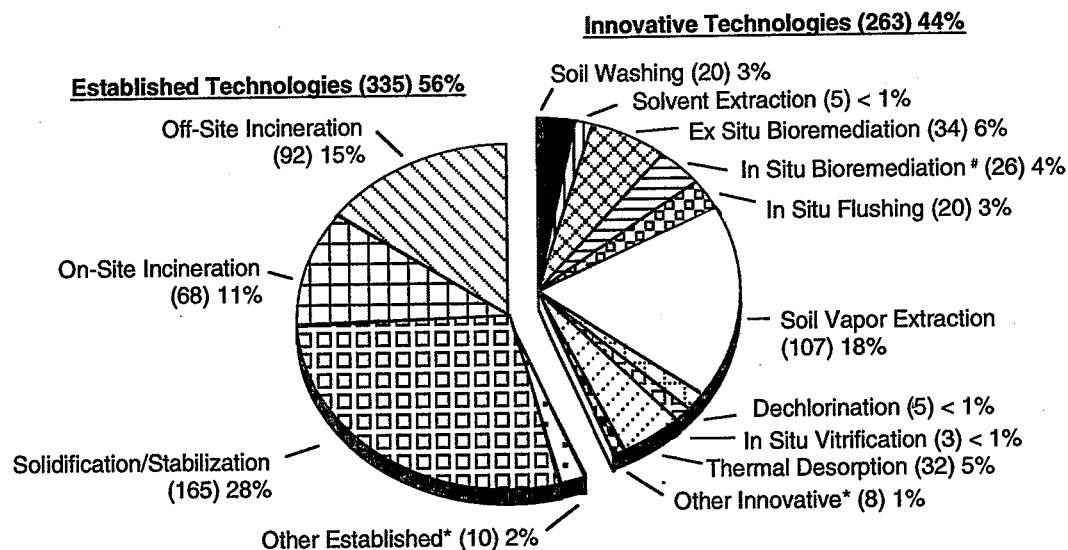
Through FY 1992, 586 treatment technologies have been selected in 504 source control RODs specifying some treatment. In addition, EPA has selected in situ bioremediation of ground water for 11 remedial sites for a total 597 treatment technologies. EPA selected in

situ bioremediation of groundwater for four remedial sites in FY 1992. The selection of multiple technologies results from the use of treatment trains or from the treatment of different wastes or areas of the site. For the 504 RODs specifying treatment for source control, Figure 1-5 lists each type of treatment technology selected and how often it has been selected or used for source control. Figure 1-5 illustrates that, through FY 1992, 44 percent of the 598 treatment technologies selected

were innovative and 56 percent were established. Tables 1-1, 1-2, and 1-3, appearing at the end of this section, contain summary information on the innovative treatment technology projects at remedial sites. Table 1-4 lists sites using established technologies. Information on the established treatment technologies is based on a review by the Office of Emergency and Remedial Response (OERR) rather than interviews of Regional or State staff.

FIGURE 1-5
SUPERFUND REMEDIAL ACTIONS: SUMMARY OF ALTERNATIVE TREATMENT TECHNOLOGIES
SELECTED THROUGH FISCAL YEAR 1992

(Total Number of Technologies = 598)



Note: Data are derived from 1982 – 1992 Records of Decision (RODs) for fiscal years and anticipated design and construction activities as of June 1993. More than one technology per site may be used.

() Number of times this technology was selected or used.

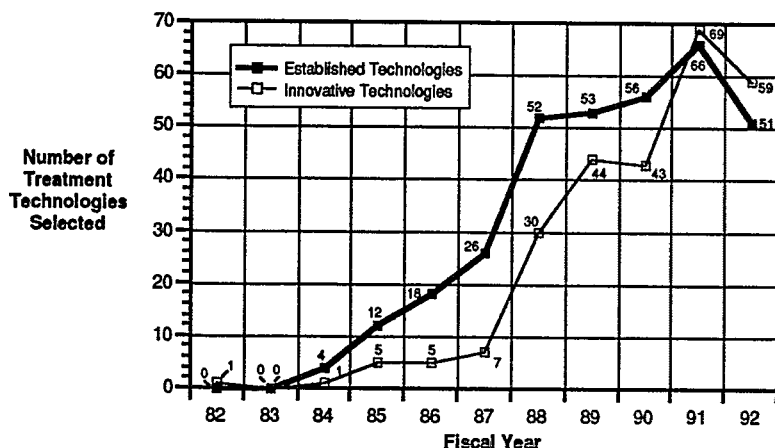
** "Other" established technologies are soil aeration, in situ flaming, and chemical neutralization. "Other" innovative technologies are air sparging, contained recovery of oily wastes, limestone barriers, and fuming gasification.*

Includes 11 in situ groundwater treatment remedies.

Figure 1-6 compares the numbers of established and innovative technologies by fiscal year. The figure indicates that more innovative technologies than established technologies have been selected in RODs in the previous two years (FY 1991 and FY 1992). Figure 1-7 compares the number of innovative technologies selected with the number of sites. This graph illustrates that some sites are using more than one innovative technology, often together in "treatment

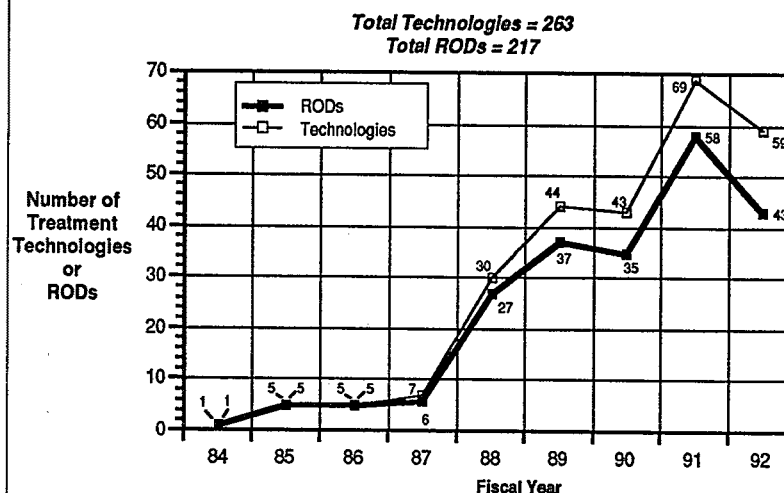
trains." The figure also indicates that the ratio of innovative technologies to sites has increased every year since FY 1986. Figure 1-8 gives the frequency of selection for each innovative technology by fiscal year. Figure 1-9 shows the frequency of selection for the four most frequently selected innovative treatment technologies, including soil vapor extraction by fiscal year.

**FIGURE 1-6
SUPERFUND REMEDIAL ACTIONS: NUMBER OF
ESTABLISHED VERSUS INNOVATIVE TREATMENT
TECHNOLOGIES**



Note: Data for innovative technologies are derived from Records of Decision (RODs) for fiscal years 1982 - 1992 and anticipated design and construction activities as of June 1993. More than one technology per site may be used.

**FIGURE 1-7
SUPERFUND REMEDIAL ACTIONS: NUMBER OF
INNOVATIVE TREATMENT TECHNOLOGIES
VERSUS CORRESPONDING RODs**



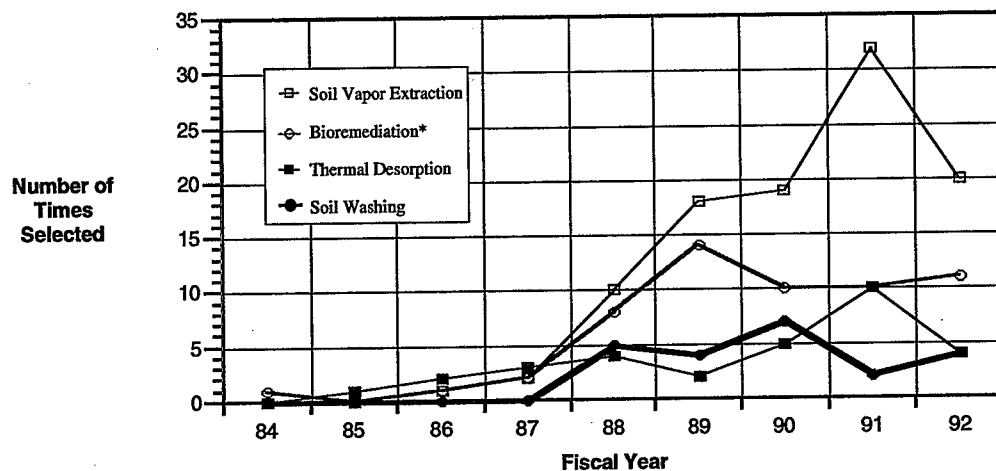
Note: Data derived from 1982 - 1992 Records of Decision (ROD) and anticipated design and construction activities as of June 1993. Number of RODs in a fiscal year usually equals the number of sites.

FIGURE 1-8
SUPERFUND REMEDIAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES BY YEAR

	Fiscal Year									
	1984	1985	1986	1987	1988	1989	1990	1991	1992	TOTAL
Soil Vapor Extraction	0	2	1	1	10	19	19	34	20	107
Bioremediation (Ex Situ)	0	0	1	0	5	8	4	4	11	34
Thermal Desorption	0	1	2	3	4	2	6	11	4	32
Bioremediation (In Situ)	0	0	0	2	3	3	4	6	8	26
Soil Washing	0	0	0	0	5	3	6	2	4	20
In Situ Flushing	0	1	1	0	3	3	2	4	6	20
Other	0	0	0	0	0	1	0	3	4	8
Dechlorination	0	1	0	0	0	0	1	3	0	5
Solvent Extraction	0	0	0	0	0	4	0	1	0	5
Chemical Treatment	0	0	0	1	0	0	0	0	2	3
Vitrification	0	0	0	0	0	1	1	1	0	3
TOTAL	1	5	5	7	30	44	43	69	59	263

NOTE: Data derived from Fiscal Year 1982 – 1992 Records of Decision (RODs) and anticipated design and construction activities as of June 1993

FIGURE 1-9
SUPERFUND REMEDIAL ACTIONS: TRENDS IN THE SELECTION OF FOUR INNOVATIVE TREATMENT TECHNOLOGIES



* Also includes in situ groundwater treatment.

NOTE: Data derived from Fiscal Year 1982 – 1992 Records of Decision (RODs) and anticipated design and construction activities as of June 1993

Status of Innovative Technology Implementation

Many of the innovative technologies documented in this report have been selected in the last several years. The design of such projects typically takes one to three years; therefore, relatively few innovative technologies have been contracted for and installed, and even fewer have been completed (Figure 1-10). In the next several years, though, many projects now in design should become operational. Table 1-3 summarizes remedial action sites using innovative treatment technologies by status and specific technology. Table 1-6 presents detailed information on remedial projects that have been completed.

FIGURE 1-10
SUPERFUND REMEDIAL ACTIONS: PROJECT
STATUS OF INNOVATIVE TREATMENT
TECHNOLOGIES AS OF JUNE 1993

Technology	Predesign/ In Design	Design Complete/ Being Installed/ Operational	Project Completed	Total
Soil Vapor Extraction	69	32	6	107
Ex Situ Bioremediation	22	11	1	34
Thermal Desorption	20	8	4	32
In Situ Bioremediation*	16	9	1	26
Soil Washing	17	3	0	20
In Situ Flushing	16	4	0	20
Dechlorination	3	1	1	5
Solvent Extraction	5	0	0	5
In Situ Vitriification	3	0	0	3
Chemical Treatment	7	1	0	3
Other Innovative Treatment	2	0	1	8
TOTAL	180 (69%)	69 (26%)	14 (5%)	263

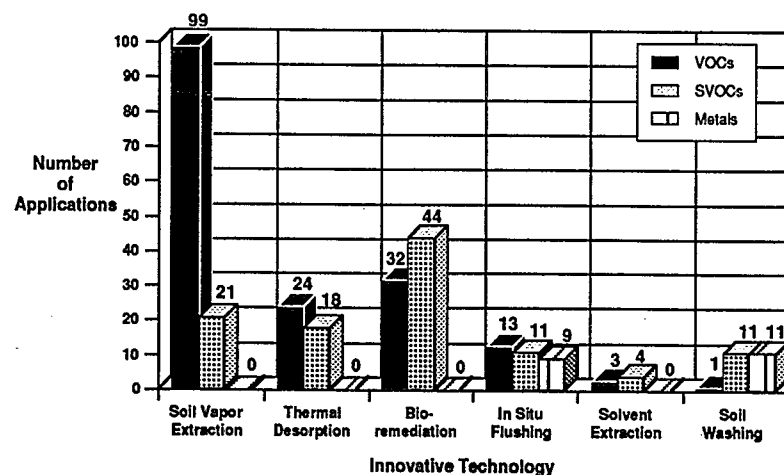
Note: Data are derived from 1982 - 1992 Records of Decision (RODs) and anticipated design and construction activities as of June 1993.

Also includes in situ groundwater treatment.

Contaminants Addressed by Innovative Treatment Technologies

The data collected for this report form the basis for an analysis of the classes of contaminants treated by each technology type at remedial action sites. Figure 1-11 provides this information, by technology, for three major contaminant groups: volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and metals. For this report, compounds are categorized as VOCs or SVOCs, according to the lists provided in EPA's SW-846 Test Methods 8240 and 8270, respectively.

FIGURE 1-11
SUPERFUND REMEDIAL ACTIONS: APPLICATION
OF INNOVATIVE TREATMENT TECHNOLOGIES



Quantity of Soil Addressed

EPA analyzed the quantity of soil treated at 183 sites using innovative treatment technologies, and for which quantity data were available (Figure 1-12). This analysis provides an indication of the scale of the projects involved.

Treatment Trains

Innovative treatment technologies in this report may be used with established or other innovative treatment technologies in treatment trains. Technologies may be combined to reduce the volume of material requiring further treatment, to prevent the emission of volatile contaminants

during excavation and mixing, or to address multiple contaminants in a single medium. Figure 1-13 presents the data on treatment trains contained within this report. Table 1-5 lists the sites at which treatment trains are being used.

FIGURE 1-12
SUPERFUND REMEDIAL ACTIONS: QUANTITIES OF SOIL TO BE TREATED BY INNOVATIVE TECHNOLOGIES

Technology	Number Of Sites With Data (Without Data)	Quantity (Cubic Yards)		
		Range	Average	Total
In Situ Flushing	12 (20)	130 - 650,000	86,000	1,035,330
Soil vapor extraction	75 (107)	62 - 2,000,000	76,000	5,729,315
Bioremediation (in situ)	10 (26)	5,000 - 258,000	72,000	720,900
Soil washing	18 (20)	1,800 - 200,000	38,000	686,900
Solvent extraction	5 (5)	15,000 - 67,000	32,500	162,500
Bioremediation (ex situ)	27 (34)	1,000 - 120,000	30,000	810,695
Thermal desorption	27 (32)	2,000 - 130,000	24,000	650,900
Dechlorination	3 (5)	16,000 - 49,000	22,000	65,000
Vitrification	3 (3)	3,600 - 5,000	4,400	13,200
Chemical treatment	2 (3)	800 - 12,700	400	800
Other	1 (8)	200 - 200	200	200
TOTAL	183 (263)	-		9,800,470

FIGURE 1-13
SUPERFUND REMEDIAL ACTIONS: TREATMENT TRAINS WITH INNOVATIVE TREATMENT TECHNOLOGIES
TOTAL TREATMENT TRAINS = 38

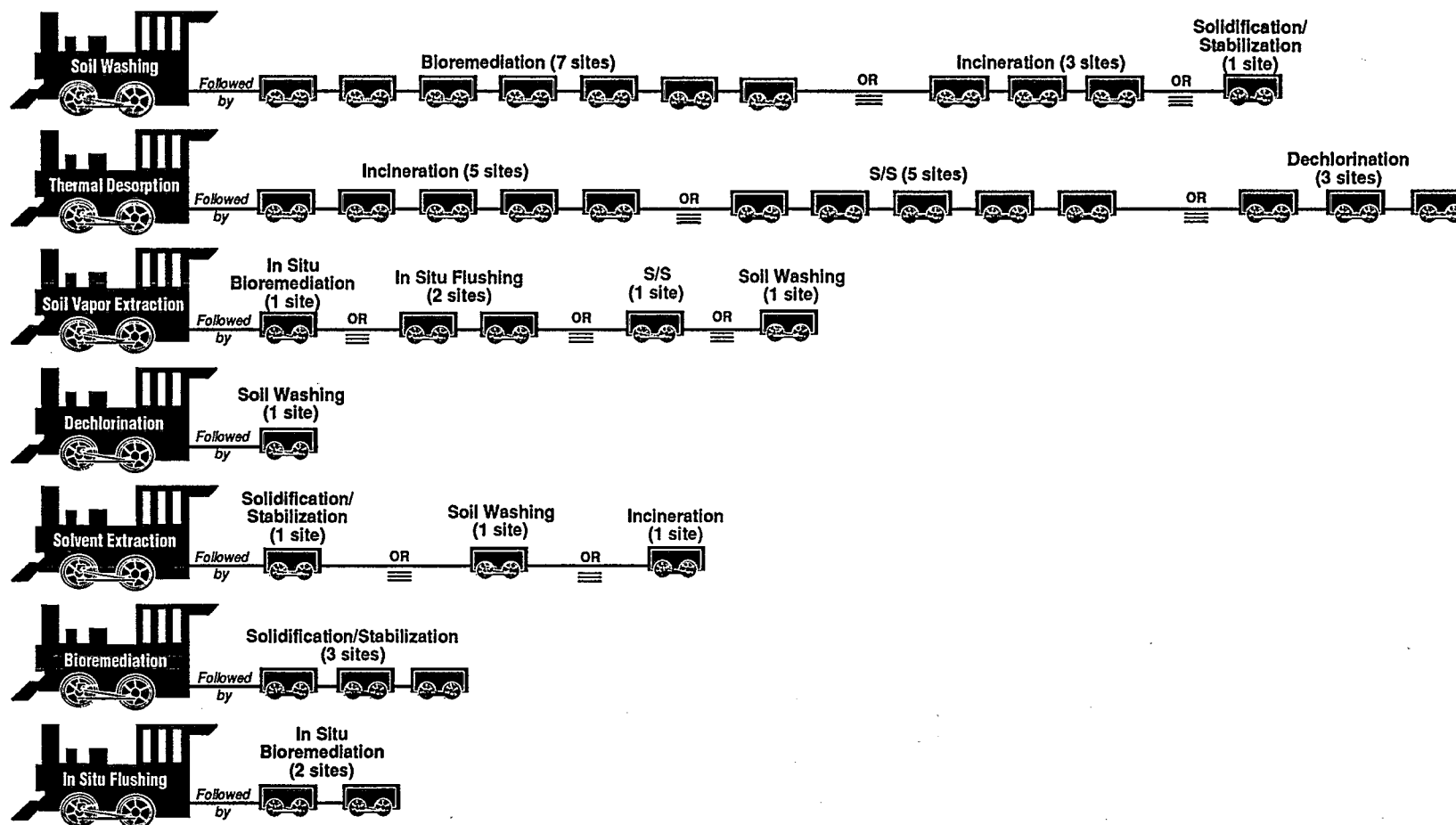


TABLE 1-1

REMEDIAL ACTIONS: SITE-SPECIFIC INFORMATION BY INNOVATIVE TREATMENT TECHNOLOGY

Table 1-1 is the principal part of this chapter. It contains the most detailed, site-specific information for remedial sites for which an innovative treatment has been selected. The columns of Table 1-1 present the following information:

Region

This column indicates the EPA Region in which the site is located.

Site Name, State, ROD Date

This column identifies the site and the operable unit for which an innovative treatment technology was selected.

A Record of Decision (ROD) documents the selection of remedy in the remedial program. The date shown in this column is the date on which a ROD was signed by an EPA official.

An asterisk (*) in this column indicates that a treatability study has been completed for this technology at the particular site.

Specific Technology

The second column describes the specific technology selected within a general category of innovative treatment. For example, within the general category of bioremediation, the specific technologies of land treatment or slurry-phase bioremediation may be chosen.

Site Description

This column provides information on the industrial source of the contamination at the site and allows analysis of the selection of innovative technologies by site type. For example, by using the information in this column, one may determine the most frequently selected innovative technology for wood preserving sites.

Media (quantity)

This column provides information on the media and quantity of material to be treated. If a treatment is used in situ, an effort has been made to include the maximum depth of the treatment to provide the reader with another parameter significant to the application.

TABLE 1-1 (Continued)

Key Contaminants Treated

The major contaminants or contaminant groups targeted by the treatment technology are shown in this column. Other contaminants may also be listed that may be treated. Other contaminants that may be present, but that are not to be addressed by the listed technology, are not included.

Status

This column indicates the status of the application of the innovative treatment technology. **Predesign** indicates that the ROD has been signed but design has not begun. During predesign, EPA may be negotiating with the potentially responsible parties, procuring the services of a design firm, or collecting information (such as conducting a treatability study) needed in the design stage. If a project is in **design**, the engineering documents needed to contract for and build the remedy are being prepared. If a remedy is **being installed**, the lead agency has signed a contract for the construction work needed to set up the remedy. The remedy is **operational** if it is completely installed and it is now being operated as a treatment system; the remedy is **completed** if the goals of the ROD or decision document for that treatment technology have been met and treatment has ceased.

One purpose of this column is to identify opportunities for vendors to become involved in the next phase of the project. Whenever possible, the season and year in which the current phase will end is given. The information is identified as the "completion planned" date.

Lead Agency, Treatment Contractor

The "lead" indicates whether federal dollars are to be used to implement the remedy (Fund lead) or the potentially responsible parties will conduct the remedy with oversight by EPA or the State (PRP lead). If a remedy is Fund lead, EPA may manage the design/construction through its contractors, the state may manage the project with Superfund dollars, or the U.S. Army Corps of Engineers (USACE) may act for EPA to manage the design or construction. No matter what agency or organization is responsible for managing the remedy, the contractor responsible for the actual installation and operation of the innovative technology also is identified, if the lead organization has selected a contractor.

Contacts/Phone

This final column provides the names and telephone numbers of useful contacts for the site or technology. The first name listed is usually the EPA remedial project manager (RPM) responsible for the site. If a remedy is being managed by the state, the name and phone number of the state RPM also is provided. Information on other useful contacts may also be provided.

Table 1-1
Remedial Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Bioremediation (Ex situ)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	Iron Horse Park*, MA (09/15/88)	Land treatment	Industrial and railyard waste	Sludge (25,000 cy)	VOCs, PAHs	Operational; Completion planned Summer 1995	PRP lead/Federal oversight; ENSR Consulting	Don McElroy 617-223-5571
2	General Motors/Central Foundry Division, OU 1, NY (12/17/90)	Slurry phase	Machine shops, Engine casting facility	Soil (100,000 cy), Sludge (91,000 cy), Sediments (62,000 cy)	PCBs	Predesign; PD Completion planned Summer 1994	PRP lead/Federal oversight	Lisa Carson 212-264-6857
2	General Motors/Central Foundry Division, OU 2, NY (03/31/92)	Slurry phase	Aluminum casting plant	Soil (59,000 cy)	PCBs	Predesign; PD Completion planned Summer 1994; Final technology selection will take place after treatability study is complete in 12/93	PRP lead/Federal oversight	Lisa Carson 212-264-6857
3	Whitmoyer Laboratories, OU 3, PA (12/31/90)	Bioremediation (Ex Situ) To be used with iron based fixation	Other organic chemical manufacturing	Soil (5,600 cy), Sediments (quantity unknown)	VOCs (TCE), SVOCs (Aniline)	In design; Design completion planned Fall 1995	PRP lead/Federal oversight; Environ	Chris Corbett 215-597-8186
3	L.A. Clarke & Sons, Lagoon Sludge OU, VA (03/31/88)	Slurry phase in tanks	Wood preserving	Sludge (278 cy)	PAHs (Creosote)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight; ICF Kaiser	Andy Palestini 215-597-1286

Status as of June 1993. See Table 1-6 for performance and operational data on completed remedial projects.

* Indicates that a treatability study has been completed.

Note: Contacts listed are EPA regional staff unless otherwise noted.

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (Ex situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
3	Ordnance Works Disposal Areas, WV (09/29/89)	Land treatment	Other organic chemical manufacturing, Other inorganic chemical manufacturing	Soil (13,500 cy)	PAHs (Carcinogenic PAHs)	Predesign; PD Completion planned Fall 1993	PRP lead/Federal oversight; ABB Environmental	Melissa Whittington 215-597-1286
4	Brown Wood Preserving*, FL (04/08/88)	Land treatment	Wood preserving, Drum storage/ disposal	Soil (7,500 cy)	PAHs (Creosote)	Completed; Operational from 10/88 to 12/91	PRP lead/Federal oversight; Remediation Technology, Inc.	Martha Berry 404-347-2643
4	Cabot Carbon/Koppers, FL (09/27/90) See also Bioremediation (In Situ), Soil Washing	Slurry phase (preceded by soil washing)	Wood preserving, Pine tar and turpentine manufacturing	Soil (quantity unknown)	SVOCs (PCP), PAHs	In design; Design completion planned Fall 1994	PRP lead/Federal oversight McLaren-Hart	Martha Berry 404-347-2643
4	Dubose Oil Products*, FL (03/29/90)	Solid phase Windrowing with aeration and irrigation in a barn	Petroleum refining and reuse	Soil (20,000 cy)	VOCs (TCE, DCE, Benzenes, Xylenes), SVOCs (PCP), PAHs	Being installed; Installation completion planned Summer 1993; Pilot scale work to begin in Sept. 1993. This will be Phase 1 of RA.	PRP lead/Federal oversight; Watech	Mark Fite 404-347-2643 George Linder (FL) 904-488-0190
4	Whitehouse Waste Oil Pits (amended ROD)*, FL (06/16/92) See also Soil Washing	Slurry phase (preceded by soil washing)	Waste oil recycler	Soil/Sludge 56,930 cy Combined	VOCs, PCBs, PAHs BTEX	In design; Design completion planned Winter 1993	Federal lead/Fund Financed	Tony Best 404-347-2643

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (Ex situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Benfield Industries, NC (07/31/92) See also Bioremediation (In Situ), Soil Washing	Slurry phase preceeded by soil washing	Bulk chemical mixing and repackaging plant.	Soil/Slurry (4,600 cy combined)	VOCs, SVOCs	Predesign	Federal lead/Fund Financed; CDM, F.I.P. Corporation	John Bornholm 404-347-7791
4	Cape Fear Wood Preserving, NC (06/30/89) See also Soil Washing	Slurry phase may be followed by s/s	Wood preserving	Soil (24,000 cy)	VOCs, PAHs	Design completed but not installed; Project on hold due to capacity assurance issue.	Federal lead/Fund Financed	Jon Bornholm 404-347-7791
4	Charles Macon Lagoon, Lagoon #10, NC (09/30/91)	Solid phase	Oil recycling and reuse	Soil (1,000 cy)	SVOCs (Fluoranthene), PAHs (Benzo(a)pyrene, Benzo(a) anthracene, Chrysene)	In design; Design completion planned Summer 1994; Currently negotiating with PRPs	PRP lead/Federal oversight; RMT	Jack Butler 919-733-2801
5	Galesburg/Koppers, IL (06/30/89)	Land treatment	Wood preserving	Soil (15,200 cy)	SVOCs (PCP, Phenols), PAHs (Creosote)	Predesign; PD Completion planned Fall 1993	PRP lead/State oversight; Remediation Technologies, Inc.	Brad Bradley 312-886-4742 Steve Davis (IL) 217-785-3913
5	Cliffs/Dow Dump*, MI (09/27/89)	Bioremediation (Ex Situ) forced aeration biological treatment	Waste disposal for charcoal manufacturing plant	Soil (9,500 cy)	VOCs (TCE, BTEX), SVOCs (Phenol), PAHs (Naphthalene)	In design; Design to be completed in Summer 1994.	PRP lead/Federal oversight; ENSR	Ken Glatz 312-886-1434

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (Ex situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Burlington Northern Railroad Tie Treating Plant*, MN (06/04/86)	Land treatment	Wood preserving	Soil (9,500 cy), Sludge (9,600 cy)	SVOCs (Phenols), PAHs	Operational; Completion planned 1994	PRP/State- Federal oversight; Remediation Technologies, Inc.	Tony Rutter 312-886-8961 Fred Jenness (MN) 612-297-8470 Richard Truax (RETEC) 303-493-3700
5	Joslyn Manufacturing and Supply Co., MN	Land treatment Unlined treatment unit with irrigation and tilling	Wood preserving	Soil (75,000 cy)	SVOCs (PCP), PAHs	Operational; Completion planned Fall 1994	PRP lead/State oversight; BARR Engineering/ GL Contracting Inc.	Kevin Turner 312-886-4444 Ann Bidwell (MN) 612-296-7827
5	South Andover Salvage Yard OU 2, MN (12/24/91)	Solid phase	Salvage yard	Soil (11,400 cy)	PAHs	Predesign	Federal lead/Fund Financed	Bruce Sypniewski 312-886-6189
5	Moss-American*, WI (09/27/90) See also Soil Washing	Slurry phase (preceded by soil washing)	Wood preserving	Soil (80,000 cy), Sediments (5,200 cy)	PAHs	Predesign; PD Completion planned 1994; Bench-scale study is underway	PRP lead/Federal oversight; Weston, Inc.(prime)/IT Corporation(sub contractor)	Bonnie Eleder 312-886-4885
6	Old Inger Oil Refinery*, LA (09/25/84)	Land treatment	Petroleum refining and reuse	Soil (120,000 cy), Sludge (quantity unknown)	VOCs (Benzene, Ethylbenzene), PAHs (Petroleum hydrocarbons)	Operational; Completion planned Fall 2001	State lead/Fund Financed; Westinghouse Haztech (installation), Operation to be awarded Spring, 1992	Paul Sieminski 214-655-6710 Mike Hahn (LA) 504-765-0487

Bioremediation (Ex situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
6	Prewitt Abandoned Refinery, NM (09/30/92) See also Soil Vapor Extraction, Other Technologies	Bioremediation (Ex Situ)	Crude oil refinery	Soil (quantity unknown)	VOCs (BTEX), PAHs	Predesign	PRP lead/Federal oversight	Monica Chapa-Smith 214-655-6780
6	Oklahoma Refining Co., OK (06/09/92) See also Bioremediation (In Situ)	Bioremediation (Ex Situ) followed by stabilization	Petroleum refining and reuse	Soil/Sludge (56,000 cy) Sediments (quantity unknown)	VOCs, Organics (LNAPLs)	Predesign	State lead/Fund Financed	Noel Bennett 214-655-8514
6	North Cavalcade Street*, TX (06/28/88)	Land treatment	Wood preserving	Soil (5,500 cy)	PAHs (Creosote)	In design; Design completion planned Summer 1993	State lead/Fund Financed	Glenn Celerier 214-655-8523 Stephen Chong 512-908-2441
6	Sheridan Disposal Services*, TX (12/29/88)	Slurry phase	Industrial landfill	Soil (13,000 cy), Sludge (30,000 cy)	VOCs (Benzene, Toluene), SVOCs (Phenols), PCBs	Predesign; PD Completion planned 1991; Biotreatment pilot study conducted in 1991. Awaiting entry of consent decrees by court.	PRP lead/State oversight	Gary Baumgarten 214-655-6749

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (Ex situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
7	Vogel Paint & Wax, IA (09/20/89)	Land treatment	Paint/ink formulation	Soil (10,000 cy)	VOCs (Methyl Ethyl Ketone, BTX)	Operational; Completion planned 1997; One cell is constructed. 20 % of remediation is accomplished.	PRP lead/State oversight; Vogel	Jack Generaux 913-551-7690 Bob Drustrup (IA) 515-281-8900
8	Broderick Wood Products OU 2, CO (03/24/92) See also Bioremediation (In Situ)	Land treatment	Wood preserving	Soil (59,000 cy), Sediments (120 cy)	VOCs, SVOCs (PCP), Dioxins, PAHs	Being installed; Installation completion planned Fall 1993; Currently conducting treatability tests	Federal lead/Fund Financed CH ₂ M Hill	Armando Saenz 303-293-1532
8	Burlington Northern (Somers Plant)*, MT (09/27/89) See also Bioremediation (In Situ)	Land treatment	Wood preserving	Soil (40,000 cy)	PAHs (Creosote)	Operational; Completion planned Fall 1993; Operations began Spring 1993	PRP lead/Federal oversight; Remediation Technologies, Inc.	Jim Harris 406-449-5414
8	Idaho Pole Company*, MT (09/28/92) See also Bioremediation (In Situ), In situ Flushing	Land treatment	Wood preserving	Soil (19,000 cy), Sediments (2,683 cy)	SVOCs (PCP), PAHs	Predesign	In negotiation	Jim Harris 406-449-5414

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (Ex situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
8	Libby Groundwater Contamination*, MT (12/30/88) See also Bioremediation (In Situ)	Land treatment using two 1-acre cells, soil is excavated & mixed	Wood preserving	Soil (45,000 cy)	VOCs (Benzene), SVOCs (PCP), PAHs (Creosote)	Operational; Completion planned 1999	PRP lead/Federal oversight; Woodward-Clyde	Jim Harris 406-449-5414 Bert Bledsoe (RSKERL) 405-332-2313
8	Wasatch Chemical*, UT (03/29/91) See also In situ Vitrification	Land treatment on an asphalt pad	Pesticide manufacturing/use /storage, Other organic chemical manufacturing, Other inorganic chemical manufacturing	Soil (1,100 cy)	VOCs (Toluene, Xylene)	Operational; Completion planned Summer 1993	PRP lead/Federal oversight; Harding/Lawson	Bert Garcia 303-293-1526
9	J.H. Baxter*, CA (09/27/90)	Land treatment to be followed by fixation for metals	Wood preserving	Soil (12,500 cy)	SVOCs (PCP), Dioxins, PAHs	In design; Design completion planned September 1993	PRP lead/Federal oversight; PRP-James L. Grant & Assoc.; Fed.- SAIC and Sub.-CDM Federal Programs	Cathy Setian 415-744-2254
9	Jasco Chemical Co., CA (09/30/92)	Bioremediation (Ex Situ) may combine aerobic and anaerobic	Chemical blending and repacking	Soil (1,095 cy)	VOCs (DCA, Methylene chloride, Acetone, Xylene)	Predesign; PD Completion planned Summer 1993	PRP lead/Federal oversight	Rosemarie Carroway 415-744-2235
10	McChord AFB Washrack Treatment Area, AK (09/28/92)	Bioremediation (Ex Situ)	Federal facility Airplane Maintenance Area	Soil (quantity unknown)	VOCs (Fuel related contaminants, Benzene) SVOCs	In design; Design completion planned Winter 1993; 30% of design completed 7/93	Air Force/EPA oversight	Marie Jennings 206-553-1173 Michael Grenko 206-984-3913

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (Ex situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
10	Umatilla Army Depot Activity, Soil Operable Unit*, OR (09/30/92)	Composting	Explosives washout	Soil (4,800 cy)	Explosives (TNT,RDX,2,4,6-tr initzotoluene,Tri nitrobenzene, DNT, Nitrobenzene, HMX, N-tertyl)	In design; Design completion planned Fall 1993; Excavation (Phase I)-design completion Fall 1993; Bio-design (Phase II)-predesign	Army lead/EPA and State oversight	Harry Craig 503-326-3689 Jeff Rodin 206-553-4497 Mark Dourghty (US Army) 503-564-5294 Mike Nelson (USACE Seattle) 206-764-3458

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (In situ)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	Hocomonco Pond, ESD, MA (07/30/92) (ROD signed 09/30/85)	In situ ground water if bioremediation fails will try in situ flushing	Wood preserving	Groundwater	PAHs (Creosote), Organics (DNAPLs)	Being installed; Installation completion planned Spring 1994	PRP lead/Federal oversight	Bob Leger 617-573-5734
2	FAA Technical Center*, NJ (09/26/89) See also Soil Vapor Extraction	In situ ground water	Jet fuel tank farm	Groundwater	VOCs (JP-4)	Design completed but not installed; Design completed 8/92	Federal facility, FAA lead	Carla Struble 212-264-4595 Keith Buch (FAA) 609-485-6644
2	Swope Oil & Chem Co., OU 2, NJ (09/27/91) See also Soil Vapor Extraction	In situ soil Bioventing with soil vapor extraction	Chemical reclamation	Soil (258,000 cy)	SVOCs (Naphthalene, DEHP, 2-ethylhexyl- phthalate)	Predesign; PD Completion planned 1993	PRP lead/Federal Oversight	Joseph Gowers 212-264-5386
2	Applied Environmental Services (Groundwater), NY (06/24/91)	In situ ground water	Bulk petroleum and hazardous waste storage facility	Groundwater	VOCs (TEX)	In design; Design completion planned Winter 1993	PRP lead/State oversight	Andrew English (NY) 518-457-0315 Jeff Tradd 518-457-1708
2	Applied Environmental Services, OU 1, NY (06/24/91) See also Soil Vapor Extraction, Other Technologies	In situ soil	Bulk petroleum and hazardous waste storage facility	Soil (quantity unknown)	VOCs (BTEX), SVOCs (Naphthalene, Bis(2-ethylhexyl) phthalate, Benzo(b))	In design; Design completion planned Winter 1993	PRP lead/State oversight; Remediation Technologies, Inc.- Design Contractor	Andrew English (NY) 518-457-0315 Jeff Tradd 518-457-1708
3	L. A. Clarke & Sons, OU 1 (Soils)*, VA (03/31/88) See also In situ Flushing	In situ soil follows creosote recovery and in situ flushing	Wood preserving	Soil (15,000 cy)	VOCs (Benzene), PAHs (Creosote, Carcinogenic PAHs)	Predesign; PD Completion planned Fall 1994	PRP lead/Federal oversight; ICF Kaiser	Andy Palestini 215-597-1286

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (In situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Cabot Carbon/Koppers, FL (09/27/90) See also Bioremediation (Ex Situ), Soil Washing	In situ soil Treating above/below gw table by nutrient addition	Wood preserving, Pine tar and turpentine manufacturing	Soil (5,000 cy)	SVOCs (PCP), PAHs	In design; Design completion planned Spring 1994	PRP lead/Federal oversight; McLaren-Hart (Design contractor)	Martha Berry 404-347-2643
4	Cabot Carbon/Koppers (Groundwater), FL (09/27/90)	In situ ground water; treating above and below gw table with nutrients	Wood preserving, Pine tar and turpentine manufacturing	Groundwater	SVOCs (PCP), PAHs	In design; Design completion planned Spring 1994	PRP lead/Federal oversight McLaren-Hart (Design Contractor)	Martha Berry 404-347-2643
4	Benfield Industries, NC (07/31/92) See also Bioremediation (Ex Situ), Soil Washing	In situ ground water; treatment of aquifer soils incidental to gw remediation	Bulk chemical mixing and repackaging plant.	Groundwater	VOCs, SVOCs	Predesign	Federal lead/Fund Financed; CDM/F.I.P. Corporation	John Bornholm 404-347-7791
5	Seymour Recycling, IN (09/30/87) See also Soil Vapor Extraction	In situ soil Nutrients plowed into soil	Chemical waste management and incineration	Soil (190,000 cy)	VOCs (TCA, Carbon Tetrachloride, TCE)	Completed; Operational, Summer 1990, August-October 1986, January- February 1987	PRP lead/Federal oversight; ABB Environmental Services	Jeff Gore 312-886-6552
5	Seymour Recycling (Groundwater), IN (09/30/87)	In situ ground water Gw treatment incidental to soil treatment	Chemical waste management and incineration	Groundwater	VOCs, SVOCs, PAHs	Operational; Gw treatment was not designed but appears to be occurring as a result of in situ soil treatment	PRP lead/Federal oversight; Geraghty Miller	Jeff Gore 312-886-6552

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (In situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Allied Chem & Ironton Coke, OH 2*, OH (12/28/90)	Bioremediation (In Situ) of lagoon sediments	Coke manufacturing	Sediments (457,000 cy)	PAHs	In design; Design completion planned Spring 1994	PRP lead/Federal oversight; IT Corporation - Design, Black & Veetch - subcontractor	Jim Van der Kloot 312-353-9309
5	Hagen Farm Site, Groundwater Control OU, WI (09/30/92)	In situ ground water	Industrial landfill, Municipal landfill	Groundwater	VOCs (Vinyl chloride, MEK, Tetrahydrofuran, Xylene)	In design; Design completion planned Spring 1995	PRP lead/Federal oversight; Warzyn - Prime	Steve Padovani 312-353-6755
5	Onalaska Municipal Landfill*, WI (08/14/90)	In situ soil Air injection but no nutrient or microbe addition	Municipal landfill	Soil (16,000 cy)	PAHs (Naphthalene)	Design completed but not installed; Completion planned Spring 1994; Completed 3 month column study with higher contamination.	Federal lead/Fund Financed; CH2M Hill-prime	Kevin Adler 312-886-7078
6	Atchison/Santa Fe/Clovis, NM (09/23/88)	In situ soil	Railyard wastes (diesel spills)	Soil (28,600 cy), Sludge (quantity unknown)	PAHs (Petroleum hydrocarbons, diesel fuel)	Operational; Began in June 1992, will end when petroleum hydrocarbons are less than 1,000 ppm	PRP lead/Federal oversight; Radian Corporation	Ky Nichols 214-655-6783
6	Oklahoma Refining Co., OK (06/09/92) See also Bioremediation (Ex Situ)	In situ soil	Petroleum refining and reuse	Soil (43,300 cy)	VOCs, Organics (LNAPLs)	Predesign	State lead/Fund Financed	Noel Bennett 214-655-8514

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (In situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
6	French Limited, TX (03/24/88)	Bioremediation (In Situ) In Situ Lagoon	Petrochemical	Sludge 300,000 cy)	VOCs, PAHs	Operational; Two 3.5 acre cells; First cell completed; second cell scheduled to be completed August 1993	PRP lead/ Federal & State oversight	Judith Black 214-655-6739
7	People's Natural Gas, IA (09/16/91)	In situ soil	Coal gasification	Soil (18,500 cy), Groundwater	VOCs (Benzene), PAHs	Predesign; PD Completion planned Spring 1994	PRP lead/Federal oversight; BARR Engineering	Bill Bunn 913-551-7792
7	Pester Burn Pond, KS (09/30/92) See also In situ Flushing	In situ soil preceded by in situ soil flushing	Refinery operation	Soil (70,000 cy)	PAHs (Benzo(a)anthracene, Chrysene)	Predesign	PRP lead/Federal oversight	Marvin Glotzbach (KS) 913-296-2783
8	Broderick Wood Products OU 2, CO (03/24/92). See also Bioremediation (Ex Situ)	In situ soil Bioremediation	Wood preserving	Soil (59,000 cy) Sediments (120 cy)	VOCs, SVOCs (PCP), PAHs	Being installed; Installation completion planned Fall 1994; Currently conducting treatability tests	Federal lead/Fund Financed CH ₂ M Hill	Armando Saenz 303-293-1532
8	Burlington Northern (Somers Plant)*, MT (09/27/89) See also Bioremediation (Ex Situ)	In situ ground water.	Wood preserving	Groundwater (2 Areas, 20 ft. deep and 30 ft. deep)	SVOCs (Phenols), PAHs (Creosote)	Being installed; Installation completion planned Fall 1993; Operational Fall 1993	PRP lead/Federal oversight; Remediation Technologies, Inc.	Jim Harris 406-449-5414

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (In situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
8	Idaho Pole Company*, MT (09/28/92) See also Bioremediation (Ex Situ), In situ Flushing	In situ ground water injection of oxygen and nutrients	Wood preserving	Groundwater	SVOCs (PCP)	Predesign	In negotiation	Jim Harris 406-449-5414
8	Libby Groundwater Contamination*, MT (12/30/88) See also Bioremediation (Ex Situ)	In situ ground water Injection of H2O2 and Potasium tripolyphosphate	Wood preserving	Groundwater (40- 80 ft. deep)	VOCs (Benzene), SVOCs (PCP), PAHs (Creosote)	Operational; Completion planned 2001; Operation began in Spetember 1991	PRP lead/Federal oversight; Woodward-Clyde	Jim Harris 406-449-5414 Bert Bledsoe (RSKERL) 405-332-2313
9	Castle Air Force Base, OU 1, CA (09/30/91)	In situ ground water Treated gw to be reinjected w/ nutrients and H2O2	Federal facility with contamination from multiple sources	Groundwater	VOCs (TCE, PCE, DCE, DCA, Carbon tetrachloride, Benzene)	In design; Design completion planned Fall 1992; 2 phases of construction; phase I-construction started, phase II-to begin within 2 years	Federal facility, U.S. Air Force lead; James Montgomery/PRC Environmental Management, Inc.	Michael Work 415-744-2392 Brad Hicks (USAF) 209-726-4841
9	Koppers Company, Inc. (Oroville Plant), CA (04/04/90) See also Soil Washing	In situ soil Followed by fixation for soil containing metals	Wood preserving	Soil (100,000 cy)	SVOCs (Polychlorinated phenols), Dioxins	In design; Design completion planned Summer 1993	PRP lead/Federal oversight	Fred Schauffler 415-744-2365

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Bioremediation (In situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
10	Eielson Air Force Base*, AK (09/29/92) See also Soil Vapor Extraction	In situ soil Bioventing	Tactical air support installation	Soil (quantity unknown)	VOCs (JP-4), SVOCs, PAHs (Petroleum Hydrocarbons, Diesel) BTEX	In design; Design completion planned Summer 1993	Federal Facility/EPA and State oversight; DERA; EA Engineering -Design	Mary Jane Nearman 206-553-6642 Rielle Markey (AK) 907-451-2117 Capt. Max Gandy (Eielson AFB) 907-377-4361

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Chemical Treatment

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	JFD Electronics/Channel Master, NC (09/10/92)	Oxidation using with hydrogen peroxide	Solvent recovery facility	Soil (800 cy), Sludge (2,200 cy)	Inorganic Cyanides	Pre-design; PD Completion planned Summer 1994	In negotiation	McKenzie Mallory 404-347-7791
4	Palmetto Wood Preserving*, SC (09/30/87)	Reduction of Cr(6) to Cr(3) using Sodium metaphosphate	Wood preserving	Soil (12,700 cy)	Metals (Chromium, Arsenic, Copper)	Completed; Operational from 9/88 to 2/89	Federal lead/Fund Financed; Roy F. Weston	Al Cherry 404-342-7791
8	Portland Cement Co. (Kiln Dust No.2 and No.3) OU 2, UT (03/31/92)	Chemical Treatment	Cement plant (waste chrome bearing bricks)	Solids (360 Tons of Brick)	Metals (Chrome VI)	In design; Design completion planned Summer 1994	State lead/Fund Financed; URS Consultants	Mike McCeney 303-294-7169

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Dechlorination

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Myers Property, NJ (09/28/90) See also Soil Washing	Dechlorination followed by soil washing	Pesticide manufacturing/use /storage	Soil (49,000 cy), Sediments (1,000 cy)	SVOCs (Hexachlorobenzene), Biocides (DDT, DDE, DDD), Dioxins (2,3,7,8-TCDD)	In design; Design completion planned Winter 1994; Design initiated concurrently with treatability studies	PRP lead/Federal oversight; Metcalf & Eddy	John Prince 212-264-1213
2	Wide Beach Development, NY (09/30/85)	Dechlorination with APEG	Contaminated road dust, driveways, ditches	Soil (40,000 cy)	PCBs	Completed; Operational from 10/90 to 6/91	Federal lead/Fund Financed; Soiltech Inc. (subcontractor to Kimmins)	Herb King 212-264-1129
3	Saunders Supply Co, OU 1, VA (09/30/91) See also Thermal Desorption	Dechlorination	Wood preserving	Sludge (700 cy)	Dioxins (TCDD equivalents)	Predesign; PD Completion planned Fall 1993	Federal lead/Fund Financed; Ecology & Environment, no vendor yet	Andy Palestini 215-597-1286
4	Smith's Farm Brooks, OU 1*, KY (09/30/91) See also Thermal Desorption	Dechlorination	Drum storage/ disposal	Soil (16,000 cy)	PCBs	Design completed but not installed; Completion planned Spring 1995	PRP lead/Federal oversight Soiltech	Tony DeAngelo 404-347-7791
4	Arlington Blending & Packaging Co., OU 1*, TN (06/28/91) See also Thermal Desorption	Dechlorination	Pesticide manufacturing/use /storage, Other organic chemical manufacturing	Liquid (quantity unknown)	VOCs (DCE), SVOCs (PCP), Biocides (Chlordane, Heptaclor)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight	Derek Matory 404-347-7791

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

In Situ Flushing

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	Tibbetts Road*, NH (09/29/92) See also Soil Vapor Extraction	Soil flushing	Illegal dumping site, primarily painting wastes and solvents.	Soil (50,000 cy)	VOCs (PCE, TCE), Metals (Arsenic, Chromium)	Predesign	Still in negotiation	Darryl Luce 617-573-5767 Mike Robinette (NH) 603-271-2014
2	Lipari Landfill*, NJ (09/30/85)	Soil flushing Flushing of area within the slurry wall, including soil and wastes.	Industrial landfill, Municipal landfill	Soil (650,000 cy)	VOCs (Bis-2- chloroethylether, DCA, Dichloromethane), SVOCs (Phenol), Metals (Chromium, Lead, Nickel, Mercury)	Operational; Completion planned 1999	Federal lead/Fund Financed; AWD, Inc.	Fred Cataneo 212-264-9542
2	Naval Air Engineering Center OU 7, interim action, NJ (03/16/92)	Soil flushing	Federal facility- landfill, fire fighting training areas, and other disposal	Soil (quantity unknown)	VOCs (Vinyl chloride, TCE, PCE, and 1,2-DCE, BTEX), PAHs (Petroleum hydrocarbons)	In design; Interim remedial action to be implemented for 3 years.	U.S. Navy/EPA oversite; Aguilar	Jeff Gratz 212-264-6667 Robert Wing 212-264-8670
2	Vineland Chemical, OU 1 and OU 2, NJ (09/29/89) See also Soil Washing	Soil flushing Flushing lagoons using treated gw	Pesticide manufacturing/use /storage	Soil (126,000 cy)	Metals (Arsenic)	In design; Design completion planned 1993	Federal lead/Fund Financed EBASCO-Design	Matthew Westgate 212-264-3406 Steve Hadel (USACE-Kansas City) 816-426-5221
2	Byron Barrel & Drum, NY (09/29/89)	Soil flushing	Drum storage/ disposal	Soil (5,200 cy), Groundwater	VOCs (TCE, DCE, TCA, MEK), Metals (Chromium, Lead)	Predesign; PD Completion planned Fall 1994	PRP lead/Federal oversight; Dames and Moore	Eduardo Gonzales 212-264-5714
2	Pasley Solvents and Chemicals, Inc., NY (04/24/92) See also Soil Vapor Extraction	Soil flushing	Tank farm and chemical distribution facility	Soil (13,000 cy)	SVOCs (Naphthalene)	In design	Federal lead/Fund Financed; Ebasco - Design contractor	Sherrel Henry 212-264-8675

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

In Situ Flushing (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
3	L. A. Clarke & Sons, OU 1 (Soils)*, VA (03/31/88) See also Bioremediation (In Situ)	Soil flushing with surfactants before in situ bioremediation	Wood preserving	Soil (15,000 cy)	VOCs (Benzene), PAHs (Creosote, carcinogenic PAHs)	In design; Design completion planned Fall 1994	PRP lead/Federal oversight; ICF Kaiser	Andy Palestini 215-597-1286
3	U.S. Titanium*, VA (11/21/89)	Dissolution of wastes (EPA is considering excavation and ex situ dissolution of wastes)	Titanium oxide production from ore digested with sulfuric acid	Soil (16,000 cy), Solids (16,000 cy)	Inorganics (Ferrous sulfate)	In design; Design completion planned Fall 1993	PRP lead/State Enforcement lead; Scitech	Vance Evans 215-597-8485 Jeff Howard (VA) 804-225-3262
4	Ciba-Geigy (MacIntosh Plant) OU 4, AL (07/14/92) See also Thermal Desorption	Soil flushing	Chemical Manufacturing	Soil 110 cy	Chlorinated pesticides, BHC Isomers, VOCs (Chloroform, Toluene, Xylenes), Biocides (Atrazine, Diazinon, Prometryn, Simazine), Metals (Copper, Lead, Arsenic, Chromium, Iron slurry)	Predesign; Design also will use treatability studies at OU-2	PRP lead/Federal oversight	Charles King 404-347-2643
4	Ciba-Geigy (MacIntosh Plant) OU 2, AL (09/30/91) See also Thermal Desorption	Soil flushing	Agriculture Applications, Pesticide manufacturing/use /storage, Other organic chemical manufacturing	Soil/Sludge (130 cy)	VOCs (BTEX) Chloroform, Biocides (DDD, DDT, DDE, BHCs, Diazinon, Chlorobenzilate)	Predesign; PD Completion planned Winter 1995;	PRP lead/Federal oversight; CDM/FPC (Demolition/ Design contractors)	Charles King 404-347-2643

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

In Situ Flushing (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	JADCO-Hughes, NC (09/27/90) See also Soil Vapor Extraction	Soil flushing Preceded by soil vapor extraction using the same horizontal wells	Plastics manufacturing, Other organic chemical manufacturing, Other inorganic chemical manufacturing, Drum storage/ disposal, Municipal water supply	Soil (6,000 cy)	VOCs (TCE, Vinyl chloride, Carbon Tetrachloride, Chloroform, BTX), SVOCs (Dichlorobenzene, Trichlorobenzene)	Being installed; Pilot study underway Completion of pilot planned Summer 1993	PRP lead/Federal oversight; Conestoga- Rovers & Associates (Design contractor)	Micheal Townsend 404-347-7791 Bruce Nicholson (NC) 919-733-2801
5	Ninth Avenue Dump, IN (06/30/89)	Soil flushing of area within slurry wall	Industrial landfill	Soil (64,000 cy), Groundwater	VOCs (TCE, BTEX)	In design; Design completion planned Summer 1996;	PRP lead/Federal oversight; Fluor-Daniel	Bernard Schorle 312-886-4746
5	Rasmussen Dump, MI (03/28/91)	Soil flushing (flushing part of recycle of treated gw)	Industrial landfill, Paint/ink formation	Soil (quantity unknown)	VOCs (Vinyl chloride, Benzene)	In design; Design completion planned Fall 1994	PRP lead/Federal oversight; Woodward Clyde - Prime	Ken Glatz 312-886-1434
6	Koppers/Texarkana*, TX (09/23/88) See also Soil Washing	Soil flushing with reinjection of treated water to 1 ft below surface	Wood preserving	Soil (19,400 cy)	PAHs (Benzo(a)pyrene, Creosote), Metals (Arsenic)	Predesign; Design activity is on hold while EPA relocates the affected community.	PRP lead/Federal oversight; ENSR (Demolition contractor)	Ursula Lennox 214-655-6743
6	South Cavalcade Street*, TX (09/26/88) See also Soil Washing	Soil flushing with the same surfactants used for the soils treated with soil washing	Wood preserving	Soil (20,000 cy)	SVOCs, PAHs (Benzo(a)pyrene, Benzo(a) anthracene, Chrysene)	In design; Design completion planned Summer 1994	PRP lead/Federal oversight	Glan Celerier 214-655-8523

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

In Situ Flushing (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
7	Pester Burn Pond, KS (09/30/92) See also Bioremediation (In Situ)	Soil flushing followed by in situ bioremediation	Refinery operation	Soil (70,000 cy), Sludge (30,000 cy)	PAHs (Benzo(a)anthracene, Chrysene)	Predesign	PRP lead/Federal oversight	Marvin Glottzbach (KS) 913-296-2783
7	Lee Chemical, MO (03/21/91)	Soil flushing	Solvent recovery facility	Soil (quantity unknown)	VOCs (TCE)	Being installed; Installation completion planned Summer 1993	PRP lead/State oversight; Clark Well and Equipment, Inc.	Steven Kinser 913-551-7728 Ron Redden (MO) 314-751-8393
8	Idaho Pole Company*, MT (09/28/92) See also Bioremediation (Ex Situ), Bioremediation (In Situ)	Soil flushing	Wood preserving	Soil (6,500 cy)	SVOCs (PCP), PAHs	Predesign	In negotiation	Jim Harris 406-449-5414
10	Union Pacific Railroad Sludge Pit, ID (09/10/91)	Soil flushing	Railroad operations, cleaning and fueling	Soil (quantity unknown)	VOCs (PCE,TCE), PAHs (Petroleum hydrocarbons), Metals (Arsenic,Cadmium)	Predesign; PD Completion planned Fall 1993	PRP lead/Federal oversight	Rob Hanson 208-334-5860 Gordon Brown 208-236-6160
10	United Chrome Products*, OR (09/12/86)	Soil flushing	Chrome plating facility	Soil (quantity unknown)	Metals (Chromium VI)	Operational; Operations began during Summer 1988	PRP lead/EPA oversite.; CH2MHill & subcontractors	Al Goodman 503-326-3685

Table 1-1
Remedial Actions: Site-Specific Information By Innovative Treatment Technology Through FY 1992

June 1993

In Situ Vitrification

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Ionia City Landfill*, MI (09/29/89)	In situ Vitrification	Municipal landfill	Soil (5,000 cy)	VOCs (Methylene Chloride, TCA, Styrene, Toluene), Metals (Lead)	In design; Design completion planned Summer 1994	PRP Lead/Federal oversight; Earth Technology Corporation	Michael Gifford 312-886-7257
8	Rocky Mountain Arsenal, M-1 Basins (OU 16), CO (02/26/90)	In situ Vitrification	Federal Facility Basin which received miscellaneous wastes	Soil (4,600 cy), Sludge (5,800 cy)	Biocides, Metals (Arsenic, Mercury)	In design; Design completion planned 1993; On hold pending reentry of vendors into the market	U. S. Army (PRP) lead	Connally Mears 303-293-1528
8	Wasatch Chemical*, UT (03/29/91) See also Bioremediation (Ex Situ)	In situ Vitrification	Pesticide manufacturing/use /storage, Other organic chemical manufacturing, Other inorganic chemical manufacturing	Soil (3,600 cy), Sludge (quantity unknown), Solids (quantity unknown)	SVOCs (Hexachlorobenzene, PCP), Biocides, Dioxins	In design; Design completion planned Summer 1993	PRP Lead/Federal oversight; Geosafe	Bert Garcia 303-293-1526

Table 1-1
Remedial Actions: Site-Specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	Kellogg-Deering Well Field, CT (09/29/89)	Soil vapor extraction	Solvent recovery facility, Industrial Complex, Illegal dumping of solvent wastes	Soil (quantity unknown)	VOCs (TCE, PCE, DCE, TCA, DCA, Vinyl chloride, BTEX)	In design; Design completion planned Fall 1994	PRP lead/Federal oversight; GZA Geoenvironmental	Leslie McVickar 617-573-9689
1	Groveland Wells*, MA (09/30/88)	Soil vapor extraction (carbon absorption for air emissions)	Manufacturing	Soil (19,000 cy)	VOCs (TCE, Methylene Chloride, DCE)	Operational	PRP lead/Federal oversight; Terra Vac	Bob Leger 617-573-5734
1	Silresim, MA (09/19/91)	Soil vapor extraction	Chemical waste reclamation	Soil (1,370 cy)	VOCs (TCE, TCA, Carbon Tetrachloride, Chloroform, Styrene)	In design; Design completion planned Winter 1994	Federal lead/Fund Financed	Leslie McVikar 617-573-9689
1	Wells G&H OU 1, MA (09/14/89)	Soil vapor extraction with air flushing	Drum storage/ disposal, Leaking UST and midnight dumping	Soil (7,400 cy)	VOCs (PCE, TCE)	Operational; OU 1 consists of 5 properties, the technology has become operational on some of the properties.	PRP lead/Federal oversight; Several contractors working on the site	Mary Garren 617-573-9613 Paula Fitzsimmons 617-223-5572
1	Mottolo Pig Farm, NH (03/29/91)	Soil vapor extraction	Uncontrolled waste site	Soil (3,400 cy)	VOCs (TCE, TCA, Vinyl chloride, DCA, DCE, Toluene, Ethylbenzene)	Being installed; Construction to start summer 1993	Federal lead/Fund Financed	Roger Duwart 617-573-9628 Michael Robinette (NH) 603-271-2014
1	South Municipal Water Supply Well*, NH (09/27/89) See also Other Technologies	Soil vapor extraction; Air sparging of gw	Ball Bearing Manufacturing	Soil (7,500 cy), Groundwater	VOCs (PCE, TCA, TCE)	Being installed; Construction to start summer 1993	PRP lead/Federal oversight	Roger Duwart 617-573-9628 Tom Andrews (NH) 603-271-2910

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	Tibbetts Road*, NH (09/29/92) See also In situ Flushing	Soil vapor extraction	Illegal dumping site, primarily painting wastes and solvents.	Soil (50,000 cy)	VOCs (PCE, TCE)	Predesign	In negotiation	Darryl Luce 617-573-5767 Mike Robinette (NH DES) 603-271-2014
1	Tinkham Garage*, NH (09/30/86)	Soil vapor extraction (carbon absorption for air emissions)	Illegal dumping site	Soil (9,000 cy)	VOCs (TCE, Chloroform, DCE, Vinyl chloride, Benzene)	In design; Operation scheduled to begin summer 1994	PRP lead/Federal oversight; Terra Vac	Diana King 617-573-9676
1	Stamina Mills, RI (09/28/90)	Soil vapor extraction	Textile Manufacturing	Soil (6,000 cy)	VOCs (DCE, TCE)	Predesign; PD Completion planned Fall 1993	PRP lead/Federal oversight	Neil Handler 617-573-9636 Mark Dennen (RI DEM) 401-277-2797
2	A O Polymer, Soil treatment phase, NJ (06/28/91)	Soil vapor extraction (carbon adsorption for air emissions)	Polymer manufacturing	Soil (7,500 cy)	VOCs (TCE, TCA, Trichlorofluoromet hane, Toluene, Ethylbenzene), SVOCs (Naphthalene, 4-methylphenol)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight; Harding-Lawson	Rich Puvogel 212-264-9836
2	FAA Technical Center*, NJ (09/26/89) See also Bioremediation (In Situ)	Soil vapor extraction	Jet fuel tank farm	Soil (33,000 cy)	VOCs (BTEX), SVOCs (Chlorophenol, Phenol)	Design completed but not installed; Design completed 8/92	Federal facility, FAA lead	Carla Struble 212-264-4595 Keith Buch (FAA) 609-485-6644

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Garden State Cleaners, NJ (09/26/91)	Soil vapor extraction	Dry cleaners	Soil (300 cy)	VOCs (PCE)	In design; Design completion planned Summer 1994; The USACE is doing the design for EPA	Federal lead/Fund Financed	Sharon Atkinson 212-264-1217
2	South Jersey Clothing, NJ (09/26/91)	Soil vapor extraction	Dry cleaners, Clothing manufacturer	Soil (1,400 cy)	VOCs (TCE)	In design; Design completion planned 1993; The USACE is doing the design for EPA.	Federal lead/Fund Financed	Sharon Atkinson 212-264-1217
2	Swope Oil & Chem Co., OU 2, NJ (09/27/91) See also Bioremediation (In Situ)	Soil vapor extraction Vacuum extraction. Biove nting (Not planned yet)	Chemical reclamation	Soil (258,000 cy)	VOCs (TCE, PCE, Toluene, Ethylbenzene, Xylene)	Predesign; PD Completion planned 1993	PRP lead/Federal oversight	Joseph Gowers 212-264-5386
2	Applied Environmental Services, OU 1, NY (06/24/91) See also Bioremediation (In Situ), Other Technologies	Soil vapor extraction with air flushing with air sparging	Bulk petroleum and hazardous waste storage facility	Soil (quantity unknown)	VOCs (BTEX)	In design; Design completion planned Winter 1993	PRP lead/State oversight; RETECH - Design Contractor	Andrew English (NY) 518-457-0315 Jeff Tradd 518-457-1708
2	Circuitron Corporation, OU 1, NY (03/29/91)	Soil vapor extraction	Electroplating	Soil (900 cy)	VOCs (TCA, PCE, TCE, DCA)	In design; Design completion planned Fall 1993	Federal lead/Fund Financed; ICF - Design Contractor	Miko Fayon 212-264-4706

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Genzale Plating Company, OU 1, NY (03/29/91)	Soil vapor extraction precedes excavation for off-site solidification	Electroplating	Soil (275 cy)	VOCs (TCE, TCA)	In design; Design completion planned Spring 1994	Federal lead/Fund Financed; CDM	Janet Cappelli 212-264-8679
2	Mattiace Petrochemicals Company, OU 1, NY (06/27/91)	Soil vapor extraction	Organic chemicals blending	Soil (17,000 cy)	VOCs (PCE, TCE,, Benzene, Xylene)	Predesign; PD Completion planned Winter 1993	Federal lead/Fund Financed; ARCR-PD	Edward Als 212-264-0522
2	Pasley Solvents and Chemicals, Inc., NY (04/24/92) See also in situ Flushing	Soil vapor extraction	Tank farm and chemical distribution facility	Soil (13,000 cy)	VOCs (TCE, PCE, Benzene)	In design	Federal lead/Fund Financed; Ebasco - Design contractor	Sherrel Henry 212-264-8675
2	SMS Instruments (Deer Park), NY (09/29/89)	Soil vapor extraction with catalytic combustor for vapors	Military aircraft component overhauler	Soil (1,250 cy)	VOCs (TCE), SVOCs (Dichlorobenzene)	Operational; Completion planned Summer 1993; Will be evaluated in Summer 1993 to determine if performance standards are achieved	Federal lead/Fund Financed; Four Seasons	Miko Fayon 212-264-4706
2	Solvent Savers, NY (09/30/90) See also Thermal Desorption	Soil vapor extraction	Solvent recovery facility, Chemical reclamation	Soil (quantity unknown)	VOCs (DCE, TCE)	Predesign; PD Completion planned Winter 1993	PRP lead/Federal oversight	Lisa Wong 212-264-9348 212-264-5712
2	Vestal Water Supply 1-1, NY (09/27/90)	Soil vapor extraction	Industrial park	Soil (25,000 cy)	VOCs (DCA, TCA, TCE, DCE)	Predesign; PD Completion planned Winter 1993	Area 2 - Fund lead; Area 4 - PRP lead	Ed Als 212-264-0522

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Upjohn Manufacturing Co., PR (09/30/88)	Soil vapor extraction	Industrial facility, chemical leak	Soil (quantity unknown)	VOCs (Carbon Tetrachloride, Acetonitrile)	Completed; Operational 1/83 to 3/88	PRP lead/Federal oversight; Terra Vac	Alison Hess 212-264-6040
3	Bendix OU 3, PA (09/30/88)	Soil vapor extraction with air flushing	Aircraft instrumentation manufacturing	Soil (33,000 cy)	VOCs (PCE, TCE, Vinyl chloride)	Predesign; PD Technology on hold pending review of Treatability Study	PRP lead/Federal oversight; ERM, Inc.	Humane Zia 215-597-0913
3	Cryochem, OU 3, PA (09/30/91)	Soil vapor extraction	Machine shops, Metal fabrication	Soil (70 cy)	VOCs (TCA, TCE, PCE, DCA, DCE)	Predesign; PD Completion planned Fall 1993	Federal lead/Fund Financed; CH2M Hill	Joe McDowell 215-597-8240
3	Henderson Road*, PA (06/30/88)	Soil vapor extraction with air flushing (Treating unsaturated soil and bedrock)	Injection well	Soil (74,000 cy)	VOCs (DCA, TCA, Toluene)	Operational; Completion date unknown	PRP lead/Federal oversight; RT Environmental Services.	Joe McDowell 215-597-8240
3	Lord-Shope Landfill*, PA (06/29/90)	Soil vapor extraction (method to be determined in design)	Industrial landfill	Soil (270,000 cy)	VOCs (PCE, TCE, Vinyl chloride, Alcohols, n-butanol), SVOCs (Ketones)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight; Eckenfelder	Dave Turner 215-597-3218
3	Raymark*, PA (12/30/91)	Soil vapor extraction	Multi-source metal fabrication facility	Soil (quantity unknown), Solids (quantity unknown)	VOCs (TCE, PCE, 1,2-DCE)	Being installed; Installation completion planned Winter 1993	Federal lead/Fund Financed	Harry Harbold 215-597-1101

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
3	Tyson's Dump*, PA (03/31/88)	Soil vapor extraction with air flushing (The system has been modified during operations)	Abandoned septic and chemical waste disposal site	Soil (30,000 cy)	VOCs (Benzene, Toluene, Xylene), SVOCs (Trichloropropane)	Operational Completion date unknown	PRP lead/Federal oversight; Terra Vac	Eugene Dennis 215-597-3153
3	Arrowhead Associates/Scovill, OU 1, VA (09/30/91)	Soil vapor extraction with air flushing	Electroplating	Soil (1,000 cy)	VOCs (TCE, PCE)	Pre-design; PD Completion planned Summer 1993	PRP lead/Federal oversight; ICF Kaiser	Ron Davis 215-597-1727
3	Defense General Supply Center, OU 5*, VA (03/25/92)	Soil vapor extraction	Cleaning and repainting of combat helmets and gas cylinders	Soil (1,000 cy)	VOCs (PCE, TCE)	In design; Design completion planned Summer 1993; 95% of design complete.	Federal Facility DLA Lead/Federal oversight; Engineering-Scie nce	Jack Potosnak 215-597-2317 Bill Sadington (DGSC) 804-279-3781
4	Hollingsworth Solderless, FL (04/10/86)	Soil vapor extraction	Electroplating	Soil (62 cy)	VOCs (TCE, Vinyl chloride, DCE)	Completed; Operational from 1/91 to 7/91	Federal lead/Fund Financed; Ebasco	John Zimmerman 404-347-2643
4	Robins AFB, Landfill and Sludge Lagoon, OU 1, GA (06/28/91)	Soil vapor extraction	Federal facility, sludge from an industrial waste water treatment plant	Soil (15,000 cy), Sludge (quantity unknown)	VOCs (TCE, PCE, Vinyl chloride, Carbon Tetrachloride)	Pre-design; PD Completion planned Summer 1992; PD completion planned Summer 1992	Federal Facility, U.S. Air Force Lead/Federal Oves	Roseanne Rudd 404-347-7791

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Charles Macon Lagoon, Lagoon #7, OU 1, NC (09/30/91)	Soil vapor extraction with air flushing	Petroleum refining and reuse, Drum storage/disposal, Waste oil recycler	Soil (1,300 cy), Sludge (quantity unknown)	VOCs (PCE)	In design; Design completion planned Summer 1994	PRP lead/Federal oversight; RMT	Giezelle Bennett (EPA) 404-347-7791 Patrick Watters (NC) 919-733-2801
4	JADCO-Hughes, NC (09/27/90) See also In situ Flushing	Soil vapor extraction with horizontal wells Followed by in situ flushing with same ports	Plastics manufacturing, Other organic chemical manufacturing, Other inorganic chemical manufacturing, Drum storage/ disposal, Municipal water supply	Soil (6,000 cy)	VOCs (Carbon tetrachloride, Chloroform, Vinyl chloride, BTX), SVOCs (Dichlorobenzene, Trichlorobenzene)	In design; Design completion planned Winter 1993; Treatability study being conducted in design	PRP lead/Federal oversight	Micheal Townsend 404-347-7791 Bruce Nicholson (NC) 919-733-2801
4	Medley Farm, OU 1, SC (05/29/91)	Soil vapor extraction	Other organic chemical manufacturing, Rubber manufacturing, Drum storage/ disposal	Soil (50,000 cy)	VOCs (DCA, DCE, TCA, Benzene, Toluene), SVOCs (Phthalates)	Predesign; Design completion planned for Summer 1993	PRP lead/Federal oversight RMI, Inc.	Ralph Howard 404-347-7791 Richard Haynes (SC) 803-734-5487
4	SCRDI Bluff Road, SC (09/12/90)	Soil vapor extraction with air flushing	Drum storage/ disposal, Solvent recovery facility	Soil (45,000 cy)	VOCs (TCA, TCE, PCA, PCE, DCA, DCE, MEK, Chlorobenzene, BTEX)	Predesign; PD Completion planned Fall 1993; Litigation from surrounding landowners has delayed progress.	PRP lead/Federal oversight ERM, DeMaximus	Steve Sandler 404-347-7791

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Carrier Air Conditioning*, TN (09/03/92)	Soil vapor extraction with air flushing	Manufacturer of heating and air conditioning units	Soil (76,500 cy)	VOCs (TCE)	Design completed but not installed; Completion planned Fall 1993	PRP lead/Federal oversight; Environmental Safety & Designs, Inc.	Beth Brown 404-347-7791
5	Acme Solvent Reclaiming, Inc. OU 2, IL (12/31/90) See also Thermal Desorption	Soil vapor extraction with air flushing	Industrial landfill, Municipal water supply	Soil (quantity unknown)	VOCs (DCA, TCA, DCE, TCE, PCE, Vinyl chloride, Benzene)	In design; Design completion planned Summer 1994	PRP lead/Federal oversight; Harding/Lawson - Prime	Deborah Orr 312-886-7576
5	American Chemical Services*, IN (09/30/92) See also Thermal Desorption	Soil vapor extraction with air flushing bioenhancement for SVOCs; air flushing w/vertical wells	Other organic chemical manufacturing, Solvent recovery facility	Soil (100,000 cy)	VOCs	Predesign; Schedule pending completion of negotiation	In negotiation	Wayde Hartwick 312-886-7067
5	Enviro. Conservation and Chemical (ROD Amendment), IN (06/07/91)	Soil vapor extraction with air flushing	Industrial landfill, Municipal water supply	Soil (quantity unknown)	VOCs (Toluene, Ethylbenzene, Xylene), SVOCs (Dichlorobenzene, Phenol), Organics (BNAs)	In design	PRP lead/Federal oversight	Karen Vendl 312-886-4739
5	Fisher Calo Chem, IN (08/07/90)	Soil vapor extraction	Municipal water supply	Soil (29,500 cy)	VOCs (PCE, DCA, TCA)	In design; Design completion planned Fall 1993	PRP lead/Federal oversight; Connestoga Rovers - Prime	Jeff Gore 312-886-6552

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	MIDCO I, IN (06/30/89)	Soil vapor extraction	Industrial landfill	Soil (10,000 cy)	VOCs (TCE, Dichloromethane, Chlorobenzene, 2-Butanone, BTX), SVOCs (Phenols), PAHs	Predesign; PD Completion planned Winter 1994	PRP lead/Federal oversight; ERM Northcentral- prime	Richard Boice 312-886-4740
5	Main Street Well Field, IN (03/29/91)	Soil vapor extraction with air flushing	Solvent recovery facility, Water Supply Contamination from many sources	Soil (22,000 cy)	VOCs (TCE)	In design; East site (60% design completion by June 1, 1993)/ West site (95 % design in progress)	PRP lead/Federal oversight	Deborah Orr 312-886-7576
5	MIDCO II, IN (06/30/89)	Soil vapor extraction	Drum storage/ disposal	Soil (12,200 cy)	VOCs (Methylene chloride, TCE, 2-Butanone, Toluene)	Predesign; PD Completion planned Winter 1994; Bench-scale treatability study is underway.	PRP lead/Federal oversight; ERM Northwest-prime	Rich Boice 312-886-4740
5	Seymour Recycling, IN (09/30/87) See also Bioremediation (In Situ)	Soil vapor extraction (No emissions treatment)	Chemical waste management and incineration	Soil (200,000 cy)	VOCs (TCA, Carbon tetrachloride, PCE, TCE, Vinyl chloride, Benzene)	Operational; Completion planned Spring 1994	PRP lead/Federal oversight; Canonie Engineering (installation), Geraghty & Miller (operation)	Jeff Gore 312-886-6552

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Wayne Waste Reclamation, IN (03/30/90)	Soil vapor extraction with air flushing	Municipal landfill, Oil reclamation	Soil (300,000 cy)	VOCs (TCE, DCE, Vinyl chloride, BTEX)	In design; Design completion planned Winter 1993; 30% design approved in March 1993	PRP lead/Federal oversight; Warzyn, Inc.	Beverly Kush 312-886-6945 Duane Heaton 312-886-6399
5	Chem Central, MI (09/30/91)	Soil vapor extraction (vapor treatment through carbon)	Chemical packaging and distribution	Soil (6,200 cy)	VOCs (DCE, TCE, TCA, BTEX), SVOCs (Naphthalene, 2-methyl naphthalene)	In design; Design completion planned Summer 1994; Predesign completed in May 1993	PRP lead/Federal oversight; WW Engineering & Science	Colleen Hart 312-353-8752
5	Clare Water Supply, MI (09/16/92)	Soil vapor extraction with air flushing air flushing with vertical wells	Industrial area with above/below ground tanks-- multisource groundwater site	Soil (54,800 cy)	VOCs (TCE, DCE, Vinyl chloride, BTEX)	Predesign; Schedule pending negotiation completion	In negotiation; Dames & Moore - Prime	Jon Peterson 312-353-1264
5	Electro-Voice, OU 1, MI (06/23/92)	Soil vapor extraction	Audio equipment manufacturer	Soil (2,100 cy)	VOCs (TCE, PCE, Vinyl chloride), PAHs	Predesign; PD Completion planned Winter 1993	PRP lead/Federal oversight; Geraghty & Miller	Beth Reiner 312-886-4783
5	Kysor Industrial*, MI (09/29/89)	Soil vapor extraction	Machine shops, Truck parts manufacturing	Soil (13,200 cy)	VOCs (TCE, Xylene, Toluene, Ethylbenzene)	In design; Design completion planned Summer 1993	PRP lead/Federal oversight	Mary L. Gustafson 312-886-6144 Julie Zacutansky 312-353-9660

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Peerless Plating, MI (09/21/92)	Soil vapor extraction with horizontal wells	Electroplating	Soil (6,500 cy)	VOCs (1,2-DCE, TCE, Benzene, Ethylbenzene)	Predesign; PD Completion planned Fall 1993	Federal lead/Fund Financed; PRC Environmental Management, Inc.	Tom Pay 312-886-5991
5	Springfield Township Dump, MI (09/29/90)	Soil vapor extraction	Industrial landfill	Soil (100,000 cy)	VOCs (TCE, TCA, Chlorobenzene, Toluene)	Predesign; PD Completion planned Fall 1992; 60 % design on ground water, 60 % design on soil vapor extraction	PRP lead/Federal oversight	Mary Lou Martin 312-353-7446
5	Sturgis Municipal Well Field, MI (09/30/91)	Soil vapor extraction with air flushing	Solvent recovery facility	Soil (quantity unknown)	VOCs (TCE, PCE, TCA)	Predesign; PD Completion planned 1993	Federal lead/Fund Financed	Terese Van Donsel 312-353-6564 Steve Padovani 312-353-6755
5	ThermoChem, Inc. OU 1, MI (09/30/91)	Soil vapor extraction with air flushing; May include biological enhancement	Municipal water supply	Soil (50,000 cy)	VOCs (PCE, TCE, Ethylbenzene, Xylene)	Predesign; PD Completion planned Winter 1993; A schedule is being negotiated with PRPs.	Federal lead/Fund Financed	Jim Hahnenberg 312-353-4213
5	Verona Well Field (Thomas Solvent/Raymond Road)*, MI (08/12/85)	Soil vapor extraction (attempted Nitrogen sparging during part of operation)	Municipal water supply	Soil (35,000 cy)	VOCs (Dichloromethane, Chloroform, Carbon tetrachloride, BTEX, Vinyl chloride), SVOCs (Naphthalene)	Completed; Spring 1992	Federal lead/Fund Financed; Terra Vac (subcontractor to CH2M Hill)	Margaret Guerrero 312-886-0399 Bill Haubal (temporary contact)

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Verona Well Field, OU 2, MI (06/28/91)	Soil vapor extraction Augmentation with air flushing is being considered	Machine shops, Municipal water supply	Soil (30,000 cy)	VOCs (PCE, TCA, Toluene)	Operational; PRP conducting air sparging pilot study for treating saturated soils. Study to start 9/93	PRP lead/Federal oversight; Geraghty & Miller (Prime), Maumee Bay (Remedial subcontractor)	Margaret Guierro 312-886-0399
5	Long Prairie Groundwater Contamination, MN (06/27/88)	Soil vapor extraction with air flushing followed by GAC for off-gas	Dry cleaners	Soil (3,600 cy)	VOCs (DCE, PCE, TCE, Vinyl chloride)	Design completed but not installed; Completion planned Spring 1994	State lead/Fund Financed	Jan Bartlett 312-886-5438 Maureen Johnson (MN) 612-296-7353
5	Miami County Incinerator, OH (06/30/89)	Soil vapor extraction with air flushing Treatment of off-gas determined in design	Municipal landfill, Surface impoundment	Soil (98,000 cy), Solids (quantity unknown)	VOCs (TCE, PCE, Toluene)	In design; Design completion planned Spring 1995; Design started in April 1993.	PRP lead/Federal oversight; Connestogo Roveis-Prime	Anthony Rutter 312-886-8961
5	Pristine (ROD Amendment)*, OH (03/30/90)	Soil vapor extraction with horizontal wells	Industrial landfill, Drum- storage/disposal	Soil (19,400 cy)	VOCs (Chloroform, DCA, PCE, TCE, Benzene), SVOCs (Phenol)	In design; Design completion planned Spring 1994; Pilot study completed	PRP lead/Federal oversight; Hydrogeo-Chem	Thomas Alcamo 312-886-7278
5	Zanesville Well Field, OH (09/30/91) See also Soil Washing	Soil vapor extraction with horizontal wells followed by excavation and soil washing for metals	Solvent recovery facility, Auto parts manufacturing	Soil (36,000 cy)	VOCs (TCE, DCE)	Predesign; PD Completion planned Fall 1993	PRP lead/Federal oversight; Geraghty & Miller - Prime	Dave Wilson 312-886-1476

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	City Disposal Corporation Landfill, WI (09/28/92)	Soil vapor extraction	Industrial landfill, Municipal landfill	Soil (quantity unknown)	VOCs (Tetrahydrofuran)	Predesign; PD Completion planned Spring 1994	PRP lead/Federal oversight; Rust Environmental - Prime	Russ Hart 312-886-4841 Mike Schmoller (WDNR) 608-275-3303
5	Hagen Farm, WI (09/17/90)	Soil vapor extraction with air flushing	Industrial and Municipal Waste Disposal	Soil (67,650 cy)	VOCs (Vinyl chloride, 2-Butanone, BTEX), Dioxins (Tetrahydrofuran)	In design; Design completion planned Summer 1993; Pilot test completed Fall 1992	PRP lead/Federal oversight; Warzyn-Prime	Steve Padovani 312-353-6755 Don DiGulim (RSKERL) 405-332-8800
5	Muskego Sanitary Landfill, Interim Action OU 1, WI (06/12/92)	Soil vapor extraction	Industrial landfill, Municipal landfill	Soil (24,200 cy)	VOCs (Vinyl chloride, 1,2-DCA, Methylene chloride, BTEX)	In design; Design completion planned Summer 1993; Operation scheduled to start in Summer 1993	PRP lead/Federal oversight; Rust - Design	Bill Haubold 312-353-6261
5	Wausau Groundwater Contamination, WI (09/29/89)	Soil vapor extraction with air flushing Soil vapor extraction	Machine shops, Bulk chemical distribution	Soil (1,300 cy)	VOCs (TCE, DCE, PCE)	Design completed but not installed; Installation to take place between June and September 1993	PRP lead/Federal oversight; Hydrogeo-Chem (sub to Conestoga-Rovers & Associates)	Margaret Guerriero 312-886-0399
6	Prewitt Abandoned Refinery, NM (09/30/92) See also Bioremediation (Ex Situ), Other Technologies	Soil vapor extraction With Air Sparging	Crude oil refinery	Soil (quantity unknown)	Organics (NAPLs)	Predesign	PRP lead/Federal oversight	Monica Chapa-Smith 214-655-6780

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
6	South Valley*, NM (09/30/88)	Soil vapor extraction	Aircraft Engine Manufacturing.	Soil (quantity unknown)	VOCs (PCE, TCE, DCE, TCA)	Design completed but not installed; Completion planned Winter 1993; Installed Jan./March 1993 for north/south end. Pilot tests completed Nov. 1992.	PRP lead/Federal oversight; Canonie Environmental Services	Bert Gorrod 214-655-6779
6	Tinker AFB (Soldier Creek Bldg. 3001), OK (08/16/90)	Soil vapor extraction	Maintenance Facility for Aircraft	Soil (quantity unknown)	VOCs (BTEX)	In design; Data on viability of SVE for the heavy fuel oil contamination being re-evaluated. Decision in Fall 1993	Air Force lead/Federal Oversight	Susan Webster 214-655-6784 Major Richard Ashworth (USAF) 405-734-3058
6	Petro-Chemical Systems, Inc., OU 2, TX (09/06/91) See also Other Technologies	Soil vapor extraction with air flushing and air sparging of ground water	Petroleum refining and reuse	Soil (300,000 cy)	VOCs (BTEX), SVOCs (Naphthalene)	Predesign	Federal lead/Fund Financed	Chris Villareal 214-655-6758

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
7	Coleman Operable Unit 29th and Mead, KS (09/29/92)	Soil vapor extraction	Formerly vehicle manufacturing, currently heating, air conditioning equipment manufacturing	Soil (2,000,000 cy)	VOCs (TCE, 1,1,1-TCA, DCE, Vinyl chloride, Toluene)	Predesign; PD Completion planned Fall 1993; Soil vapor system already in place. ROD calls for expansion of the system	PRP lead/Federal oversight; Groundwater Technologies, Inc.	Ken Rapplean 913-551-7769
7	Hastings GW Contamination (Colorado Ave)*, NE (09/28/88)	Soil vapor extraction	Industrial Metal Finishing/Cleaning	Soil (42,700 cy)	VOCs (PCE, TCE, DCE, TCA)	In design; Design completion planned Fall 1993	PRP lead/Federal oversight; ENSR - Design Contractor	Darrel Sommerhauser 913-551-7711 Richard Schlenker (NE) 402-471-3388
7	Hastings GW Contamination (Far-Mar Co.)*, NE (09/30/88)	Soil vapor extraction	Former Grain Storage Area (Fumigants)	Soil (quantity unknown)	VOCs (Carbon tetrachloride, Ethylene dibromide)	In design; Design completion planned Summer 1993	PRP lead/Federal oversight; Burns & McDonald	Susan Hoff 913-551-7786
7	Hastings GW Contamination, Well No. 3*, NE (09/26/89)	Soil vapor extraction	Former Grain Storage Area (Fumigants)	Soil (quantity unknown)	VOCs (Carbon tetrachloride, Chloroform)	Operational; Completion planned Fall 1993; SVE began operation on June 1, 1992. The State will take over the project in FALL 1993 if needed.	Federal lead/Fund Financed; Morrison Knudsen, EPA contractor	Diane Easley 913-551-7797 Steve Roe (Morrison Knudsen) 303-793-5054 Richard Schlenker (NE) 402-471-3388

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
7	Lindsay Manufacturing, NE (09/28/90)	Soil vapor extraction with air	Electroplating, Galvanized pipes for irrigation systems	Soil (quantity unknown)	VOCs (DCA, DCE, TCE, PCE)	In design; Design completion planned Fall 1993	PRP lead/Federal oversight; Dames & Moore	Cecelia Tapla 913-551-7733
7	Waverly Groundwater Contamination, NE (09/26/90)	Soil vapor extraction	Grain Storage (Fumigants)	Soil (160,000 cy)	VOCs (Carbon tetrachloride, Chloroform)	Operational; Completion planned 2001; This project began in February, 1988.	PRP lead/Federal oversight	Jeff Weatherford 913-551-7695 Mary Hansen (Argonne National Lab) 708-252-4938
8	Chemical Sales Company, OU 1*, CO (06/27/91)	Soil vapor extraction with air flushing will recirculate treated emissions	Chemical sales and distribution, spillage at tank farm	Soil (360,000 cy)	VOCs (PCE, TCE)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight; ENSR	Jim Berkley 303-293-1817
8	Martin Marietta (Denver Aerospace), CO (09/24/90) See also Thermal Desorption	Soil vapor extraction	Aerospace Equipment Manufacturer - Bulk storage facility and industrial landfill	Soil (quantity unknown)	VOCs (TCE)	In design; Design completion planned Fall 1993	PRP/State oversite under RCRA; Geraghty & Miller	George Dancik 303-293-1506 Susan Chaki 303-331-4832
8	Rocky Flats OU 2, Interim Remedial Action Plan, CO (08/10/92)	Soil vapor extraction	Former nuclear weapons research and development, production, and plutonium reprocessing complex	Soil (quantity unknown)	VOCs (TCE, PCE, Carbon tetrachloride)	Predesign; Pilot-scale is scheduled to start operation in December 1993	DOE Lead/Federal Oversight DOE ERP; Woodward Clyde, Roy Weston, Layne Environmental	Bill Frazier 303-294-1081 Scott Grace (Rocky Flats) 303-966-7199

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
8	Rocky Mountain Arsenal OU 18, interim response, CO (02/26/90)	Soil vapor extraction	Motor Pool Area	Soil (100 ft radius down to 60 ft deep; approximately 70,000 cy)	VOCs (TCE)	Completed; March 1992	U. S. Army (PRP) lead; Roy Weston, Ebasco, Harding Lawson, Woodward Clyde	Stacey Eriksen 303-294-1083
8	Sand Creek Industrial OU 1*, CO (09/29/89)	Soil vapor extraction	Pesticide manufacturing/use /storage, Refinery	Soil (38,000 cy)	VOCs (TCE, PCE, Methylene chloride, Chloroform)	Operational; Completion planned Fall 1994	Federal lead/Fund Financed; OHM	Erna Acheson 303-294-1971
9	Hassayampa Landfill, AZ (08/15/92)	Soil vapor extraction	Municipal Landfill	Soil (quantity unknown)	VOCs (1,1-DCE, 1,1,1-TCA, 1,2-DCE, 1,1-DCA, TCE)	In design; Pilot-scale system is in operation	PRP lead/Federal oversight; Conestoga Rovers	Tom Dunkleman 415-744-2395
9	Indian Bend Wash, South Area, OU 1, AZ (09/12/91)	Soil vapor extraction May vary technology at different units	Dry cleaners, Electroplating, Industrial landfill, Municipal landfill	Soil (quantity unknown)	VOCs (PCE, TCE, TCA)	Predesign; Pilot project under the SACM initiative, schedules for different units may vary.	PRP lead/Federal oversight; mixed funding	Jeff Dhont 415-744-2363
9	Mesa Area Groundwater Contamination, AZ (09/27/91)	Soil vapor extraction	Semiconductor manufacturing	Soil (quantity unknown)	VOCs (TCE, PCE, 1,1-DCE)	Operational	PRP lead/State oversight	Richard Oln (AZ) 602-207-4176
9	Motorola 52nd Street, AZ (09/30/88)	Soil vapor extraction	Manufacturing Facility	Soil (quantity unknown)	VOCs (TCA, TCE, DCE, PCE, Carbon tetrachloride, Ethylbenzene)	Predesign; A pilot system is operational but the full scale technology is still being evaluated.	PRP lead/State oversight; Dames and Moore	Mike Montgomery 415-744-2394 Jeff Kulon (AZ) 602-207-4181 Hotline 602-207-4360

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
9	Phoenix-Goodyear Airport Area (North & South Fac), AZ (09/26/89)	Soil vapor extraction	Defense related manufacturing	Soil (271,200 cy)	VOCs (DCE, TCE, MEK, Acetone)	Operational	PRP lead/Federal oversight; Metcalf & Eddy - South Area, Malcome Pirnie - North Area	Craig Cooper 415-744-2370
9	Fairchild Semiconductor (San Jose)*, CA (03/20/89)	Soil vapor extraction with air flushing	Semiconductor manufacturing	Soil (1,933,488 cy)	VOCs (TCA, 1,1-DCE, Freon)	Completed; Fall 1990; Remedial efforts will be reevaluated in January 1994	PRP lead/State oversight; Canonic Engineering	Helen McKinley 510-744-2236 Steve Hill (CA) 510-286-0433
9	Fairchild Semiconductor/MTV-I*, CA (06/09/89)	Soil vapor extraction	Semiconductor manufacture and metal finisher	Soil (quantity unknown)	VOCs (TCE, PCE, Vinyl chloride, DCA, DCE, Freon), SVOCs (Phenol)	In design; Design completion planned 1993	PRP lead/Federal oversight	Kelly McCarthy 415-744-2236
9	Fairchild Semiconductor/MTV-II*, CA (06/30/89)	Soil vapor extraction	Semiconductor manufacturing, Metal Finishing Facility	Soil (50,000 cy)	VOCs (TCE, PCE, Vinyl chloride, DCA, DCE, Freon), SVOCs (Phenol)	In design; Design completion planned 1993	PRP lead/Federal oversight; Canonic Engineering	Kelly McCarthy 415-744-2236
9	IBM (San Jose)*, CA (12/15/88)	Soil vapor extraction	Computer Manufacture	Soil (24,000 cy)	VOCs (TCA, Acetone, Freon, Isopropyl Alcohol, Xylenes)	Operational; Completion planned Spring 2001	PRP lead/State oversight; Terra Vac	Helen McKinley 415-744-2236 Steve Morris (CA) 510-286-0304
9	Intel, Mountain View*, CA (06/09/89)	Soil vapor extraction	Semiconductor manufacturing, Metal Refinishing Facility Aircraft Maintenance	Soil (3,000 cy)	VOCs (TCE, PCE, Vinyl chloride, DCA, DCE, Freon), SVOCs (Phenol)	In design; Design completion planned 1993	PRP lead/Federal oversight; Weiss Associates	Kelly McCarthy 415-744-2236

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
9	Intersil/Siemens, CA (09/27/90)	Soil vapor extraction	Semiconductor manufacturing	Soil (quantity unknown)	VOCs (TCE, 1,1,1-TCA, Xylene)	Operational	State lead/Fund Financed; Levine-Fricke	Marie Lacey 415-744-2234 Steve Morse (CA) 510-286-0304 Steve Hill (CA) 510-286-0433
9	Lawrence Livermore National Laboratory, CA (07/15/92)	Soil vapor extraction	Research and Development facility	Soil (quantity unknown)	VOCs (Fuel hydrocarbons)	Predesign	DOE lead/Federal oversight	Mike Gill 415-744-2383
9	Monolithic Memories/AMD - Arques, Subunit 2, CA (09/11/91)	Soil vapor extraction	Semiconductor manufacturing	Soil (3,400 cy)	VOCs (PCE, TCE, TCA), PAHs	Operational; Started operation in Spring 1993	State lead/Fund Financed; Pacific Environmental Group	Cecil Felix (CA) 510-464-1249
9	National Semiconductor (Monolithic Memories), CA (09/11/91)	Soil vapor extraction	Semiconductor manufacturing	Soil (quantity unknown)	VOCs (PCE, DCE, Toluene, Ethylbenzene, Xylene), SVOCs	Operational; Completion planned Spring 1996	State lead/Fund Financed; Harding Lawson & Associates	Cecil Felix (CA) 510-286-1249
9	Pacific Coast Pipeline, CA (03/31/92)	Soil vapor extraction	Petroleum refining and reuse; petroleum pumping station	Soil (quantity unknown)	VOCs (Methylene chloride, DCA, Benzene, Toluene, Ethylbenzene)	In design	PRP lead/Federal oversight	Mike Montgomery 415-744-2403
9	Purity Oil Sales OU 2, CA (09/30/92)	Soil vapor extraction	Petroleum refining and reuse	Soil (64,000 cy)	VOCs (TCE, PCE, Chlorobenzene, BTEX)	Predesign	Federal lead/Fund Financed	Martin Hausladen 415-744-2246
9	Raytheon, Mountain View*, CA (06/09/89)	Soil vapor extraction	Semiconductor manufacturing, Metal Refinishing and Aircraft Maintenance	Soil (15,000 cy)	VOCs (TCE, PCE, Vinyl chloride, DCA, DCE, Freon), SVOCs (Phenol)	In design; Design completion planned 1993	PRP lead/Federal oversight; Golder & Associates	Kelly McCarthy 415-744-2236

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
9	Sacramento Army Depot, Tank 2 OU, CA (12/09/91)	Soil vapor extraction with air flushing	Solvent storage tank at an Army Depot	Soil (150 cy)	VOCs (PCE, Ethylbenzene and Total Xylenes)	Completed; Operational from 11/91 to 4/93	Army (USACE)/DoD Financed - IRP Program; Terra Vac	Marlin Mezquita 415-744-2393 George Siller (USACE, Sacramento) 916-557-7418 Dan Oburn (Sacramento Army Depot) 916-388-4344
9	Signetics (AMD 901), TRW OU, CA (09/11/91)	Soil vapor extraction	Semiconductor manufacturing	Soil (8,000 cy)	VOCs (TCE, DCE, DCA)	Being installed; Installation completion planned Summer 1993; Operational by end of Summer 1993	PRP lead/State oversight; Weiss & Associates	Joe Healy 415-744-2231 Kevin Graves (CA) 510-286-0435
9	Signetics (Advanced Micro Devices 901), CA (09/11/91)	Soil vapor extraction	Semiconductor manufacturing	Soil (32,000 cy)	VOCs (TCE, DCE, DCA, TCA)	Operational; Although the ROD was signed in FY 91, the PRP has operated the remedy for several years	PRP lead/State oversight; M-Con Associates, Engineering- Science	Joe Healy 415-744-2231 Kevin Graves (CA) 510-286-0435
9	Solvent Service, CA (09/27/90)	Soil vapor extraction with heat enhancement	Municipal water supply	Soil (quantity unknown)	VOCs (TCA, Acetone, Ethylbenzene, Xylene), SVOCs (Dichlorobenzene)	Operational	In negotiation; David Keith Todd Engineers	Marie Lacey 415-744-2234 Steve Morse (CA) 510-286-0304 Kevin Graves (CA) 510-286-0435

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
9	Spectra Physics, OU 1, CA (03/22/91)	Soil vapor extraction with horizontal wells	Semiconductor manufacturing, Laser manufacturing	Soil (7,200 cy)	VOCs (TCE)	Operational; Completion planned Winter 1997	PRP lead/State oversight; Levine - Fricke	Sean Hogan 415-744-2233 Steve Hill (CA) 510-286-4833
9	Teledyne Semiconductors, CA (03/22/91)	Soil vapor extraction with horizontal wells	Semiconductor manufacturing	Soil (quantity unknown)	VOCs (TCE)	Operational; Completion planned Winter 1997	PRP lead/State oversight; Levine Fricke	Sean Hogan 415-744-2233 Carla Dube 510-286-1041
9	Van Waters and Rogers, CA (09/30/91)	Soil vapor extraction	Chemical packaging facility	Soil (quantity unknown)	VOCs (PCE, TCE, TCA)	Operational	PRP lead/State oversight; Van Waters and Rogers	Marie Lacey 415-744-2234 Susan Gladstone (CA) 510-286-0840
9	Watkins-Johnson*, CA (06/29/90)	Soil vapor extraction	Semiconductor manufacturing	Soil (quantity unknown)	VOCs (DCE, TCA, TCE)	In design; Design completion planned Summer 1993	PRP lead/Federal oversight; Watkins	Kay Lawrence 415-744-2289
10	Eielson Air Force Base*, AK (09/29/92) See also Bioremediation (In Situ)	Soil vapor extraction	Tactical air support installation	Soil (quantity unknown)	Floating Petroleum Products (VOCs, SVOCs, and Petroleum Hydrocarbons), BTEX, TPH-JP-4, Diesel	In design; Design completion planned Summer 1993	Federal Facility Lead/Funded DERA EA Engineering	Mary Jane Nearman 206-553-6642 Capt. Max Gandy 907-377-4361 Rielle Markey 907-451-2117
10	Commencement Bay/S. Tacoma Channel/Well 12A*, WA (05/03/85)	Soil vapor extraction with air flushing	Municipal water supply, Waste oil and solvent reclamation; paint and lacquer thinner manufacturing	Soil (100,000 cy)	VOCs (PCE, TCE, TCA)	Operational; Completion planned Fall 1998	Federal Lead/Fund Financed; AWD Technologies, Inc.	Kevin Rochlin 206-553-2106

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Washing

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Ewan Property*, NJ (09/29/89) See also Solvent Extraction	Using water only preceded by solvent extraction	Industrial waste dumping	Soil (22,000 cy)	Metals (Chromium, Lead, Copper, Barium)	Predesign; PD Completion planned 1995; Start date contingent upon progress in OU 1. Completion planned 1995.	In negotiation	Dave Rosoff 212-264-5397
2	King of Prussia, NJ (09/28/90)	Using water with washing agents as an additive residual sludges to be land disposed	Waste processing facility	Soil (20,000 cy), Sludge (quantity unknown), Sediments (quantity unknown)	Metals (Chromium, Copper, Nickel), DDT/DDD/DDE, Hexachloro- benzene, Dioxin (2,3,7,8), TCDD	Design completed but not installed; Completion planned Summer 1993	PRP lead/Federal oversight; Alternative Remedial Technologies, Inc.	Gary Adamkiewicz 212-264-7592
2	Myers Property, NJ (09/28/90) See also Dechlorination	Soil washing coupled with dechlorination	Pesticide manufacturing/use /storage	Soil (49,000 cy), Sediments (1,000 cy)	Metals (Cadmium, Lead, Arsenic, Copper)	In design; Design completion planned Winter 1994; Treatability studies underway	PRP lead/Federal oversight; Metcalf & Eddy	John Prince 212-264-1213
2	Vineland Chemical, OU 1 and OU 2, NJ (09/29/89) See also In situ Flushing	Soil Washing	Pesticide manufacturing/use /storage	Soil (62,000 cy)	Metals (Arsenic)	In design; Design completion planned 1993	Federal lead/Fund Financed EBASCO Design	Matthew Westgate 212-264-3406 Steve Hadel (USACE - Kansas City) 816-426-5221
2	GE Wiring Devices, PR (09/30/88)	Using water with Potassium Iodide KI2 solution as an additive	Wiring services facility	Soil (5,500 cy), Sludge (quantity unknown)	Metals (Mercury)	In design; Design completion planned Spring 1994	PRP lead/Federal oversight	Caroline Kwam 212-264-0151

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Washing (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Cabot Carbon/Koppers, FL (09/27/90) See also Bioremediation (Ex Situ), Bioremediation (In Situ)	Soil washing Followed by bioremediation of fines	Wood preserving, Pine tar and turpentine manufacturing	Soil (6,400 cy)	SVOCs (PCP), PAHs, Metals (Arsenic, Chromium)	In design; Design completion planned Fall 1994	PRP lead/Federal oversight McLaren-Hart Design Contractor	Martha Berry 404-347-2643
4	Whitehouse Waste Oil Pits (ROD Amendment)*, FL (06/16/92) See also Bioremediation (Ex Situ)	Soil Washing	Waste oil recycler	Soil (quantity unknown), Sludge (56,930 cy)	VOCs, PCBs, PAHs, BTEX	In design; Design completion planned Winter 1993	Federal lead/Fund Financed	Tony Best 404-347-2643
4	Benfield Industries, NC (07/31/92) See also Bioremediation (Ex Situ), Bioremediation (In Situ)	Soil Washing	Bulk chemical mixing and repackaging plant.	Soil (4,300 cy)	VOCs, SVOCs, Inorganics	Predesign	Federal lead/Fund Financed; CDM/F.I.P. Corporation	John Bornholm 404-347-7791
4	Cape Fear Wood Preserving, NC (06/30/89) See also Bioremediation (Ex Situ)	Using water with sodium hydroxide or hydrochloric acid as an additive may be followed by s/s	Wood preserving	Soil (24,000 cy)	VOCs (Benzene), PAHs (Creosote), Metals (Copper, Chromium, Arsenic)	Design completed but not installed; Project on hold due to a capacity assurance issue.	Federal lead/Fund Financed	Jon Bornholm 404-347-7791
5	United Scrap Lead/SIA, OH (09/30/88)	Soil Washing	Battery recycling /disposal	Soil (109,000 cy), Solids (55,000 cy), Sediments (quantity unknown)	Metals (Lead)	In design; Design completion planned Spring 1994	Federal lead/Fund Financed	Anita Boseman 312-886-6941

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Washing (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Zanesville Well Field, OH (09/30/91) See also Soil Vapor Extraction	Soil washing ex situ preceded by soil vapor extraction	Solvent recovery facility, Auto parts manufacturing	Soil (1,800 cy)	Metals (Lead, Mercury)	Predesign; PD Completion planned Fall 1993	PRP lead/Federal oversight; Geraghty & Miller - Prime	Dave Wilson 312-886-1476
5	Moss-American*, WI (09/27/90) See also Bioremediation (Ex Situ)	Soil washing followed by slurry phase bioremediation of fines	Wood preserving	Soil (80,000 cy)	PAHs	Predesign; PD Completion planned 1994; Bench-scale study is underway.	PRP lead/Federal oversight; Weston, Inc.(prime)/Ber gmann USA (subcontractor)	Bonnie Eleder 312-886-4885
6	Arkwood, AR (09/28/90)	Soil washing (incineration of residuals)	Wood preserving	Soil (20,400 cy), Sludge (425 cy)	SVOCs (PCP), Dioxins, PAHs	In design; Design completion planned Fall 1995	PRP lead/Federal oversight; ERM Southwest	Cynthia Kaleri 214-655-6772
6	Koppers/Texarkana*, TX (09/23/88) See also In situ Flushing	Using water with a surfactant as an additive	Wood preserving	Soil (19,400 cy)	PAHs (Benzo(a)pyrene, Creosote), Organics (NAPLs), Metals (Arsenic)	Predesign; Soil washing project is on hold while EPA relocates community affected by the site	PRP lead/Federal oversight; ENSR (Demolition contractor)	Ursula Lennox 214-655-6743
6	South Cavalcade Street*, TX (09/26/88) See also In situ Flushing	Using water with surfactants as an additive (followed by incineration of contaminated residual	Wood preserving	Soil (11,000 cy)	PAHs (Benzo(a)pyrene, Benzo(a)anthracen e, Chrysene)	In design; Design completion planned Summer 1994	PRP lead/Federal oversight	Glenn Celerier 214-655-8523

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Soil Washing (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
9	FMC (Fresno)*, CA (06/28/91)	Soil washing followed by s/s	Pesticide manufacturing/use /storage	Soil (30,000 cy)	Biocides (DDT, EDB, Toxaphene, Chlordane)	Predesign; Completion of bench test scheduled for December 1993	PRP lead/State oversight; Canonie Engineering	Tom Dunkelman 415-744-2395 Mike Pfister (FMC) 209-297-3934
9	Koppers Company, Inc. (Oroville Plant), CA (04/04/90) See also Bioremediation (In Situ)	Soil washing Method un- determined; fixation for metal, 19000 cy	Wood preserving	Soil (200,000 cy)	SVOCs (Polychlorinated phenols), Dioxins	In design; Design completion planned Summer 1993	PRP lead/Federal oversight; Dames & Moore	Fred Schauffler 415-744-2365
9	Sacramento Army Depot, Oxidation Lagoons OU, CA (09/30/92)	Soil Washing	Evaporation ponds for metal plating wastewater	Soil (15,000 cy)	Metals (Arsenic, Cadmium, Lead)	In design; 100% design completion planned for 6/93. Full-scale operation scheduled to start in September 1993	Army (USACE)/DoD Financed - IRP Program; US PCI	Marlin Mezquita 415-744-2393 George Siller (USACE) 916-557-7418 Dan Oburn (Sacramento Army Depot) 916-388-4344
10	Gould Battery, OR (03/31/88)	Soil washing Solids will be s/s	Battery recycling /disposal	Soil (11,000 cy), Solids (90,000 cy)	Metals (Lead)	Operational; Completion planned Summer 1995; Scheduled to be in operation from fall 1993 to 1995.	PRP lead/Federal oversight; Canonie Environmental	Jerry Balcom (Portland USACE) 503-326-4192 Chip Humphries (Oregon operations) 503-326-2678

Soil Washing (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
10	Naval Submarine Base, Bangor Site A, OU 1, WA (12/06/91)	Soil washing with UV oxidation of ground water	Federal facility, ordnance detonation	Soil (7,100 cy)	Explosives (TNT, RDX, DNT)	Predesign; PD Completion planned Winter 1993; Design will begin after completion of a treatability study	Navy Lead/DoD Funded IRP; OHM, Remediation Services Corp.	Harry Craig 503-326-3689 Patti Kelly (DoD) 206-369-5099 Jeff Rodin 206-553-4497

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Solvent Extraction

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	Norwood PCBs, MA (09/29/89)	Solvent Extraction	PCB capacitor manufacturing/ testing	Soil (35,000 cy), Sediments (5,000 cy)	VOCs (TCE), SVOCs (Trichlorobenzene), PCBs, PAHs	In design; Design completion planned Spring 1994	Federal lead/Fund Financed; Metcalf & Eddy - Design Contractor	Robert Canciarulo 617-573-5778
1	O'Connor*, ME (09/27/89)	Solvent extraction (may be followed by s/s for lead)	Salvage and electrical transformer recycling	Soil (23,500 cy), Sediments (quantity unknown)	PCBs, PAHs	In design; Design completion planned Winter 1995	PRP lead/Federal oversight	Ross Gilleland 617-573-5766
2	Ewan Property*, NJ (09/29/89) See also Soil Washing	Solvent extraction (followed by Soil Washing to treat inorganics)	Industrial waste dumping	Soil (22,000 cy)	VOCs (PCE, TCE, TCA, Methylene Chloride, BTX)	Predesign; PD Completion planned 1995; Start date contingent upon progress in OU-1. Completion estimate 1995.	In negotiation	Dave Rosoff 212-264-5397
4	Carolina Transformer, NC (08/29/91)	Solvent extraction (may be followed by s/s)	Transformer repair	Soil (15,000 cy)	PCBs	In design; Design completion planned Spring 1994	Federal lead/Fund Financed	Luisse Flores 404-347-7791
6	United Creosoting*, TX (09/29/89)	Solvent extraction (critical fluid extraction followed by incineration of fluids)	Wood preserving	Soil (67,000 cy)	VOCs, Dioxins	In design; Design completion planned Fall 1993	State lead/Fund Financed; C.F. Systems, proprietor of propane cf extraction	Earl G. Hendrick 214-655-5519 LaReine Pound (TX) 512-467-7897

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Thermal Desorption

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	Cannon Engineering/Bridgewater, MA (03/31/88)	Thermal aeration (vapors captured on carbon)	Chemical waste storage and incineration facility	Soil (11,000 cy)	VOCs (TCE, Vinyl chloride, Benzene, Toluene)	Completed;	PRP lead/Federal oversight; Canonic Engineering	Richard Goehlert 617-573-5742
1	Re-Solve*, MA (09/24/87)	Thermal Desorption	Chemical reclamation facility	Soil (22,500 cy)	PCBs	Being installed; Operation planned summer 1993.	PRP lead/Federal oversight; ENSR	Joe Lemay 617-573-9622
1	McKin*, ME (07/22/85)	Thermal aeration (vapors captured on carbon)	Industrial landfill	Soil (11,500 cy)	VOCs (TCE, BTX)	Completed;	PRP lead/Federal oversight; Canonic Engineering	Sheila Eckman 617-573-5784
1	Union Chemical Co., OU 1, ME (12/27/90)	Low temperature thermal treatment	Solvent recovery facility, Paint stripping	Soil (10,000 cy)	VOCs (TCE, DCE, PCE, Xylene)	Design completed but not installed; Being installed in summer 1994	PRP lead/Federal oversight	Ed Hathaway 617-573-5782 Christopher Rushton (ME DEP) 207-287-2651
1	Ottati & Goss, NH (01/16/87)	Thermal aeration	Drum storage/disposal	Soil (16,000 cy)	VOCs (TCE, PCE, DCA, Benzene)	Completed;	PRP lead/Federal oversight; Canonic Engineering	Stephen Calder 617-573-9626
2	Industrial Latex, OU 1, NJ (09/30/92)	Low temperature thermal treatment	Manufacturing of chemical adhesives and natural and synthetic rubber compounds	Soil (38,000 cy), Sludge (6 cy), Solids (quantity unknown), Soil (800 gl)	PCBs	Predesign	Federal lead/Fund Financed	Paola Pascetta 212-264-9001 Robert McKnight 212-264-1870

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Thermal Desorption (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Lipari Landfill Marsh Sediment*, NJ (07/11/88)	Low temperature thermal treatment	Industrial landfill, Municipal landfill	Sediments (60,000 cy)	VOCs, SVOCs	Design completed but not installed; Completion planned Summer 1993	In negotiation	Tom Graff (USACE, Kansas City) 816-426-2296
2	Metaltec/Aerosystems, OU 1 - Soil Treatment*, NJ (06/30/86)	Low temperature thermal treatment (vapors captured on carbon)	Metal Manufacturing	Soil (9,000 cy)	VOCs (TCE)	Being installed; Installation completion planned Winter 1993; Design complete; Contractor being procured (Bids due June 1993)	Federal lead/Fund Financed; Army Corp of Engineers (Contractor)/ vendor unknown	Ron Rusin 212-264-1873 Mark Keast 816-426-5832 (x - 3032)
2	Reich Farms*, NJ (09/30/88)	Thermal desorption (vapors will be captured on carbon)	Drum storage/disposal	Soil (6,000 cy)	VOCs (TCE, PCE, TCA), SVOCs (Phthalates)	Predesign	PRP lead/Federal oversight	Gary Adamkiewicz 212-264-7592
2	Waldick Aerospace Devices*, NJ (09/29/87)	Low temperature thermal treatment (followed by offsite s/s and disposal)	Manufacture/ Electroplating of Plane Parts	Soil (3,000 cy)	VOCs (TCE, PCE)	Operational; Completion planned Fall 1993; Operational since June 1993	Federal lead/Fund Financed; Chemical Waste Management	George Buc (USACE-NY District) 908-389-3040 Ron Ackerman (USACE-NY District) 908-389-3040

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Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Thermal Desorption (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	American Thermostat, NY (06/29/90)	Low temperature thermal treatment	Thermostat Manufacturing	Soil (15,000 cy), Sediments (300 cy)	VOCs (PCE, TCE)	In design; Design completion planned August 1993	Federal lead/Fund Financed; TAMS Consultants/William Environmental Services.(Vendor)	Christos Tsiamis 212-264-5713
2	Claremont Polychemical - Soil Remedy, NY (09/28/90)	Low temperature thermal treatment	Paint/ink formation	Soil (3,000 cy)	VOCs (PCE)	In design; Design completion planned Fall 1993	State lead/Fund Financed; USACE/Rust Environmental	Dick Kaplin 212-264-3819
2	Fulton Terminals, Soil Treatment, NY (09/29/89)	Low temperature thermal treatment	Former hazardous waste storage facility	Soil (4,000 cy)	VOCs (TCE, DCE, Benzene, Xylene)	In design; Design completion planned Summer 1993	PRP lead/Federal oversight	Christos Tsiamis 212-264-5713
2	Sarney Farm, NY (09/27/90)	Thermal desorption (followed by onsite incineration of organics)	Industrial landfill, Municipal landfill	Soil (quantity unknown)	VOCs (Chloroform, TCE, PCE, Toluene), SVOCs (Phthalates)	In design; Design completion planned Winter 1993	Federal lead/Fund Financed	Kevin Willis 212-264-8777
2	Solvent Savers, NY (09/30/90) See also Soil Vapor Extraction	Low temperature thermal treatment	Solvent recovery facility, Chemical reclamation	Soil (60,000 cy)	VOCs (DCE, TCE), PCBs	Predesign; PD Completion planned Winter 1993	PRP lead/Federal oversight	Lisa Wong 212-264-5712

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Thermal Desorption (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
3	U.S.A. Letterkenny SE Area, OU1*, PA (06/28/91)	Low temperature thermal treatment (may need s/s for metals after thermal desorption)	Munitions manufacturing/storage, Drum storage	Soil (14,000 cy)	VOCs (TCE, Ethylbenzene, Xylene)	Design completed but not installed; Completion planned Summer 1993	Federal facility; McLaren Hart	Denis Orenshare 215-597-7858 Georgette Myers (Letterkenny) 717-267-8483
3	Saunders Supply Co, OU 1, VA (09/30/91). See also Dechlorination	Low temperature thermal treatment (Vapors will be captured on carbon)	Wood preserving	Soil (25,000 cy)	SVOCs (PCP)	Predesign; PD Completion planned Fall 1993	Federal lead/Fund Financed; Ecology & Environment, no vendor yet	Andy Palestini 215-597-1286
4	Ciba-Geigy (MacIntosh Plant) OU 4, AL (07/14/92) See also In situ Flushing	Thermal desorption Liquid injection incineration	Chemical Manufacturing	Soil (110 cy), Sludge (quantity unknown)	VOCs (Chloroform, Toluene, Xylene), Biocides (Atrazine, Diazinon, Prometryn, Simazine)	Predesign; Design will also use treatability studies being conducted at OU-2	PRP lead/Federal oversight	Charles King 404-347-2643
4	Ciba-Geigy Corp. (MacIntosh Plant) OU 2, AL (09/30/91) See also In situ Flushing	Low temperature thermal treatment to be evaluated during treatability study	Agriculture Applications, Pesticide manufacturing/use /storage, Other organic chemical manufacturing	Soil (130,000 cy), Sludge (quantity unknown)	VOCs, Biocides	In design; Design completion planned Winter 1995; Treatability studies ongoing	PRP lead/Federal oversight; CDM/FPC (Demolition /Design contractors)	Charles King 404-347-2643
4	Smith's Farm Brooks, OU 1*, KY (09/30/91) See also Dechlorination	Low temperature thermal treatment	Drum storage/disposal	Soil (16,000 cy)	PCBs, PAHs (Carcinogenic PAHs)	Design completed but not installed; Completion planned Spring 1995	PRP lead/Federal oversight	Tony DeAngelo 404-347-7791

Thermal Desorption (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Aberdeen Pesticide Dumps, OU 4, NC (09/30/91)	Thermal desorption (treatment for organic vapors not yet determined)	Pesticide manufacturing/use /storage	Soil (124,000 cy)	Biocides (DDT, Toxaphene, Benzene Hexachloride)	Pre-design; PD Completion planned September 1993	PRP lead/Federal oversight	Kay Crane 404-347-7791 Randy McElveen 919-733-2801
4	Potter's Septic Tank Service Pits, NC (08/05/92)	Low temperature thermal treatment	Waste petroleum and septic tank sludge disposal pit	Soil (10,100 cy), Sludge (quantity unknown)	VOCs (BTEX), PAHs (Carcinogenic PAHs, Naphthalene)	In design; Design completion planned Summer 1994	Federal lead/Fund Financed	Beverly Hudson 404-347-7791
4	Sangamo/Twelve-Mile/Hartwell PCB, OU 1, SC (12/19/90)	Low temperature thermal desorption (vapors captured on carbon)	Capacitor manufacturer	Soil (80,000 cy) sludge (20,000 cy)	PCBs, VOCs	Design; Design Completion planned Fall 1993;	PRP lead/Federal oversight	Bernie Hayes 404-347-7791 Richard Haynes (SC) 803-734-5487
4	Wamchem*, SC (06/30/88)	Thermal desorption (vapors captured on carbon)	Former Dye Manufacturing Plant	Soil (2,000 cy)	VOCs (BTX)	Being installed Four seasons	PRP lead/Federal oversight	Terry Tanner 404-347-7791
4	Arlington Blending & Packaging Co., OU 1*, TN (06/28/91) See also Dechlorination	Thermal desorption; residual soil and vapor to be dechlorinated	Pesticide manufacturing/use /storage, Other organic chemical manufacturing	Soil (5,000 cy)	VOCs (DCE), SVOCs (PCP), Biocides (Chlordane, Heptachlor)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight	Derek Matory 404-347-7791
5	Acme Solvent Reclaiming, Inc. OU 2, IL (12/31/90) See also Soil Vapor Extraction	Low temperature thermal treatment (followed by s/s for lead)	Industrial landfill, Municipal water supply	Soil (6,000 cy)	VOCs (TCA, DCE, DCA, TCE, PCE, Vinyl chloride, 4-methyl 2 pentanone,, Benzene), SVOCs (Naphthalene), PCBs	In design; Design completion planned Summer 1994	PRP lead/Federal oversight; Harding Lawson - Prime	Deborah Orr 312-886-7576

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Thermal Desorption (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Outboard Marine/Waukegan Harbor, OU 3*, IL (03/31/89)	Low temperature thermal treatment	Marine Products Manufacturing	Soil (16,000 cy), Sediments (quantity unknown)	PCBs	Completed; Summer 1992	PRP lead/Federal oversight; Soiltech	Cindy Nolan 312-886-0400
5	American Chemical Services*, IN (09/30/92) See also Soil Vapor Extraction	Low temperature thermal treatment	Other organic chemical manufacturing, Solvent recovery facility	Soil (quantity unknown), Sludge (quantity unknown), Solids (65,000 cy)	VOCs, PCBs	Predesign; Schedule pending completion of negotiation with PRPs	In negotiation	Wayde Hartwick 312-886-7067
5	Anderson Development (ROD Amendment)*, MI (09/30/91)	Low temperature thermal treatment off-site disposal of residuals	Other organic chemical manufacturing	Soil (8,000 cy), Sludge (quantity unknown)	Organics (MBOCAs, 4, 4'- Methylene, Bis-2-chloroaniline)	Operational; Completion planned Summer 1993; Treatment began Jan. 5, 1992. In pilot test, MBOCAs reduced from 2,800 ppm in sludges to 1.6 ppm	PRP lead/Federal oversight; Weston Services, Inc	Jim Hahnenberg 312-353-4213
5	Carter Industries*, MI (09/18/91)	Low temperature thermal treatment (followed by s/s of soils and incin. of PCB oil)	Scrap metal salvager	Soil (46,000 cy), Solids (quantity unknown)	PCBs	In design; Design completion planned Fall 1994	PRP lead/Federal oversight; Connestoga-Rovers Associates	Jon Peterson 312-353-1264
8	Martin Marietta (Denver Aerospace), CO (09/24/90) See also Soil Vapor Extraction	Low temperature thermal treatment (followed by s/s of soils and incin. of vapors)	Aerospace Equipment Manufacturer - Bulk storage facility and industrial landfill	Soil (2,300 cy)	VOCs (TCE), PCBs	In design	PRP lead/State oversight; under RCRA; Geraghty & Miller	George Dancik 303-293-1506 Susan Chaki (CO) 303-331-4832

Table 1-1

Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Thermal Desorption (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
8	Sand Creek Industrial, OU 5*, CO (09/28/90)	Low temperature thermal treatment	Pesticide manufacturing/use /storage	Soil (8,000 cy)	Organics (Biocides)	Predesign; Prepared ROD amendment to change remedy from soil washing	Federal lead/Fund Financed	Erna Acheson 303-294-1971

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Other

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	South Municipal Water Supply Well*, NH (09/27/89) See also Soil Vapor Extraction	Air sparging	Ball Bearing Manufacturing	Groundwater	VOCs (PCE,TCA,TCE)	Being installed; Construction to start summer 1993	PRP lead/Federal oversight	Roger Duwart 617-573-9628 Tom Andrews (NH) 603-271-2910
2	Applied Environmental Services, OU 1, NY (06/24/91) See also Bioremediation (In Situ), Soil Vapor Extraction	Air sparging	Bulk petroleum and hazardous waste storage facility	Groundwater	VOCs (BTEX), SVOCs	In design; Design completion planned Winter 1993	PRP lead/State oversight	Andrew English (NY) 518-457-0315 Jeff Tradd 518-457-1708
3	Brodhead Creek, OU 1, PA (03/29/91)	CROW technology using hot water injection to mobilize coal tar	Coal gasification site	Soil (200 cy), Groundwater	PAHs, DNAPLs	Predesign; PD Completion planned Summer 1993	PRP lead/Federal oversight; Remediation Technologies, Western Research Institute	John Banks 215-597-8555
3	Brown's Battery Breaking Site, OU 2, PA (07/02/92) See also Other Technologies	Limestone barrier	Battery recycling/ disposal	Groundwater	Metals (Lead)	Predesign; PD Completion planned Winter 1993	PRP lead/Federal oversight	Richard Watman 215-697-8996
3	Brown's Battery Breaking Site, OU 2, PA (07/02/92) See also Chemical Treatment	Fuming Gasification	Battery recycling /disposal	Soil (quantity unknown), Solids (quantity unknown)	Metals (Lead), PCBs, PAHs, Chlorinated Pesticides, Phthalate esters	Predesign; PD Completion planned Winter 1993	PRP lead/Federal oversight	Richard Watman 215-597-8996
3	Tonolli Corporation, PA (09/30/92)	Limestone barrier	Battery recycling /disposal	Groundwater	Metals (Lead)	Predesign; PD Completion planned Summer 1993	PRP lead/Federal oversight	Linda Dietz 215-597-6906

Table 1-1
Remedial Actions: Site-specific Information By Innovative Treatment Technology Through FY 1992

June 1993

Other (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
6	Prewitt Abandoned Refinery, NM (09/30/92) See also Bioremediation (Ex Situ), Soil Vapor Extraction	Air Sparging	Crude oil refinery	Groundwater	Organics (NAPLs)	Predesign	PRP lead/Federal oversight	Monica Chapa-Smith 214-655-6780
6	Petro-Chemical Systems, Inc., OU 2, TX (09/06/91) See also Soil Vapor Extraction	Air sparging	Petroleum refining and reuse	Groundwater	VOCs (BTEX), SVOCs (Naphthalene)	Predesign	Federal lead/Fund Financed; not chosen	Chris Villareal 214-655-6758

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TABLE 1-2

REMEDIAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES BY EPA REGION

Table 1-2 summarizes the innovative treatment technologies used at remedial action sites in each EPA region and within each region by state.

TABLE 1-2. REMEDIAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES
BY EPA REGION

June 1993

TECHNOLOGY	SITE NAME	STATE	TECHNOLOGY	SITE NAME	STATE
<u>REGION 1</u>			<u>REGION 2 (continued)</u>		
Soil Vapor Extraction	Kellogg-Deering Well Field	CT	Solvent Extraction	Ewan Property	NJ
Bioremediation (Ex situ)	Iron Horse Park	MA	Thermal Desorption	Industrial Latex, OU 1	NJ
Bioremediation (In situ)	Hocomonco Pond, ESD	MA	Thermal Desorption	Lipari Landfill Marsh Sediment	NJ
Solvent Extraction	Norwood PCBs	MA	Thermal Desorption	Metaltec/Aerosystems, OU 1	NJ
Thermal Desorption	Cannon Engineering/Bridgewater	MA	Thermal Desorption	Reich Farms	NJ
Thermal Desorption	Re-Solve	MA	Thermal Desorption	Waldick Aerospace Devices	NJ
Soil Vapor Extraction	Groveland Wells	MA	Soil Vapor Extraction	A O Polymer, Soil treatment phase	NJ
Soil Vapor Extraction	Silresim	MA	Soil Vapor Extraction	FAA Technical Center	NJ
Soil Vapor Extraction	Wells G&H OU 1	MA	Soil Vapor Extraction	Garden State Cleaners	NJ
Solvent Extraction	O'Connor	ME	Soil Vapor Extraction	South Jersey Clothing	NJ
Thermal Desorption	McKin	ME	Soil Vapor Extraction	Swope Oil & Chem Co., OU 2	NJ
Thermal Desorption	Union Chemical Co., OU 1	ME	Bioremediation (Ex situ)	General Motors/Central Foundry OU 1	NY
In situ Flushing	Tibbetts Road	NH	Bioremediation (Ex situ)	General Motors/Central Foundry OU 2	NY
Thermal Desorption	Ottati & Goss	NH	Bioremediation (In situ)	Applied Environmental Services (GW)	NY
Soil Vapor Extraction	Mottolo Pig Farm	NH	Bioremediation (In situ)	Applied Environmental Services OU 1	NY
Soil Vapor Extraction	South Municipal Water Supply Wells	NH	Dechlorination	Wide Beach Development	NY
Soil Vapor Extraction	Tibbetts Road	NH	In situ Flushing	Byron Barrel & Drum	NY
Soil Vapor Extraction	Tinkham Garage	NH	In situ Flushing	Pasley Solvents and Chemicals	NY
Air Sparging	South Municipal Water Supply Wells	NH	Thermal Desorption	American Thermostat	NY
Soil Vapor Extraction	Stamina Mills	RI	Thermal Desorption	Claremont Polychemical - Soil	NY
<u>REGION 2</u>			Thermal Desorption	Fulton Terminals, Soil Treatment	NY
Bioremediation (In situ)	FAA Technical Center	NJ	Thermal Desorption	Sarney Farm	NY
Bioremediation (In situ)	Swope Oil & Chem Co., OU 2	NJ	Thermal Desorption	Solvent Savers	NY
Dechlorination	Myers Property	NJ	Soil Vapor Extraction	Applied Environmental Services OU 1	NY
In situ Flushing	Lipari Landfill	NJ	Soil Vapor Extraction	Circuitron Corporation, OU 1	NY
In situ Flushing	Naval Air Engineering Center OU 7	NJ	Soil Vapor Extraction	Genzale Plating Company, OU 1	NY
In situ Flushing	Vineland Chemical, OU 1 and OU 2	NJ	Soil Vapor Extraction	Mattiace Petrochemicals Company	NY
Soil Washing	Ewan Property	NJ	Soil Vapor Extraction	Pasley Solvents and Chemicals	NY
Soil Washing	King of Prussia	NJ	Soil Vapor Extraction	SMS Instruments (Deer Park)	NY
Soil Washing	Myers Property	NJ	Soil Vapor Extraction	Solvent Savers	NY
Soil Washing	Vineland Chemical, OU 1 and OU 2	NJ	Soil Vapor Extraction	Vestal Water Supply 1-1	NY
			Air Sparging	Applied Environmental Services OU 1	NY
			Soil Washing	GE Wiring Devices	PR
			Soil Vapor Extraction	Upjohn Manufacturing Co.	PR

**TABLE 1-2. REMEDIAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES
BY EPA REGION (continued)**

June 1993

TECHNOLOGY	SITE NAME	STATE	TECHNOLOGY	SITE NAME	STATE
REGION 3			REGION 4 (continued)		
Bioremediation (Ex situ)	Whitmoyer Laboratories, OU 3	PA	Soil Washing	Cabot Carbon/Koppers	FL
Thermal Desorption	U.S.A. Letterkenny SE Area, OU	PA	Soil Washing	Whitehouse Waste Oil Pits	FL
Soil Vapor Extraction	Bendix	PA	Soil Vapor Extraction	Hollingsworth Solderless	FL
Soil Vapor Extraction	Cryochem, OU 3	PA	Soil Vapor Extraction	Robins AFB, Landfill and Sludge Lagoon	GA
Soil Vapor Extraction	Henderson Road	PA	Dechlorination	Smith's Farm Brooks, OU 1	KY
Soil Vapor Extraction	Lord-Shope Landfill	PA	Thermal Desorption	Smith's Farm Brooks, OU 1	KY
Soil Vapor Extraction	Raymark	PA	Bioremediation (Ex situ)	Benfield Industries	NC
Soil Vapor Extraction	Tyson's Dump	PA	Bioremediation (Ex situ)	Cape Fear Wood Preserving	NC
Limestone Barrier	Brown's Battery Breaking Site	PA	Bioremediation (Ex situ)	Charles Macon Lagoon, Lagoon # 10	NC
Crow Technology	Brodhead Creek, OU 1	PA	Bioremediation (In situ)	Benfield Industries	NC
Fuming Gasification	Brown's Battery Breaking Site	PA	Chemical Treatment	JFD Electronics/Channel Master	NC
Limestone Barrier	Tonolli Corporation	PA	In situ Flushing	JADCO-Hughes	NC
Bioremediation (Ex situ)	L.A. Clarke & Sons, Lagoon Sludge OU	VA	Soil Washing	Benfield Industries	NC
Bioremediation (In situ)	L. A. Clarke & Sons, OU 1	VA	Soil Washing	Cape Fear Wood Preserving	NC
Dechlorination	Saunders Supply Co, OU 1	VA	Solvent Extraction	Carolina Transformer	NC
In situ Flushing	L. A. Clarke & Sons, OU 1	VA	Thermal Desorption	Aberdeen Pesticide Dumps, OU 4	NC
In situ Flushing	U.S. Titanium	VA	Thermal Desorption	Potter's Septic Tank Service Pits	NC
Thermal Desorption	Saunders Supply Co, OU 1	VA	Soil Vapor Extraction	Charles Macon Lagoon, Lagoon # 7	NC
Soil Vapor Extraction	Arrowhead Associates/Scovill	VA	Soil Vapor Extraction	JADCO-Hughes	NC
Soil Vapor Extraction	Defense General Supply Center	VA	Chemical Treatment	Palmetto Wood Preserving	SC
Bioremediation (Ex situ)	Ordnance Works Disposal Areas	WV	Thermal Desorption	Sangamo/Twelve-Mile/Hartwell PCB	SC
			Thermal Desorption	Wamchem	SC
			Soil Vapor Extraction	Medley Farm, OU 1	SC
			Soil Vapor Extraction	SCRDI Bluff Road	SC
			Dechlorination	Arlington Blending & Packaging	TN
			Thermal Desorption	Arlington Blending & Packaging	TN
			Soil Vapor Extraction	Carrier Air Conditioning	TN
REGION 4			REGION 5		
In situ Flushing	Ciba-Geigy (MacIntosh Plant) OU 2	AL	Bioremediation (Ex situ)	Galesburg/Koppers	IL
In situ Flushing	Ciba-Geigy (MacIntosh Plant) OU 4	AL	Thermal Desorption	Acme Solvent Reclaiming, Inc.	IL
Thermal Desorption	Ciba-Geigy (MacIntosh Plant) OU 2	AL	Thermal Desorption	Outboard Marine/Waukegan Harbor	IL
Thermal Desorption	Ciba-Geigy (MacIntosh Plant) OU 4	AL	Soil Vapor Extraction	Acme Solvent Reclaiming, Inc.	IL
Bioremediation (Ex situ)	Brown Wood Preserving	FL			
Bioremediation (Ex situ)	Cabot Carbon/Koppers	FL			
Bioremediation (Ex situ)	Dubose Oil Products	FL			
Bioremediation (Ex situ)	Whitehouse Waste Oil Pits	FL			
Bioremediation (In situ)	Cabot Carbon/Koppers	FL			
Bioremediation (In situ)	Cabot Carbon/Koppers (Groundwater)	FL			

TABLE 1-2. REMEDIAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES
BY EPA REGION (continued)

June 1993

TECHNOLOGY	SITE NAME	STATE	TECHNOLOGY	SITE NAME	STATE
<u>REGION 5 (continued)</u>			<u>REGION 5 (continued)</u>		
Bioremediation (In situ)	Seymour Recycling	IN	Soil Vapor Extraction	Zanesville Well Field	OH
Bioremediation (In situ)	Seymour Recycling (Ground water)	IN	Bioremediation (Ex situ)	Moss-American	WI
In situ Flushing	Ninth Avenue Dump	IN	Bioremediation (In situ)	Hagen Farm Site, Ground Water OU	WI
Thermal Desorption	American Chemical Services	IN	Bioremediation (In situ)	Onalaska Municipal Landfill	WI
Soil Vapor Extraction	American Chemical Services	IN	Soil Washing	Moss-American	WI
Soil Vapor Extraction	Enviro. Conservation and Chemical	IN	Soil Vapor Extraction	City Disposal Corporation Landfill	WI
Soil Vapor Extraction	Fisher Calo Chem	IN	Soil Vapor Extraction	Hagen Farm	WI
Soil Vapor Extraction	MIDCO I	IN	Soil Vapor Extraction	Muskego Sanitary Landfill	WI
Soil Vapor Extraction	Main Street Well Field	IN	Soil Vapor Extraction	Wausau Groundwater Contamination	WI
Soil Vapor Extraction	MIDCO II	IN			
Soil Vapor Extraction	Seymour Recycling	IN			
Soil Vapor Extraction	Wayne Waste Reclamation	IN			
Bioremediation (Ex situ)	Cliffs/Dow Dump	MI	<u>REGION 6</u>		
In situ Flushing	Rasmussen Dump	MI	Soil Washing	Arkwood	AR
In situ Vittrification	Ionia City Landfill	MI	Bioremediation (Ex situ)	Old Inger Oil Refinery	LA
Thermal Desorption	Anderson Development	MI	Bioremediation (Ex situ)	Prewitt Abandoned Refinery	NM
Thermal Desorption	Carter Industries	MI	Bioremediation (In situ)	Atchison/Santa Fe/Clovis	NM
Soil Vapor Extraction	Chem Central	MI	Soil Vapor Extraction	Prewitt Abandoned Refinery	NM
Soil Vapor Extraction	Clare Water Supply	MI	Soil Vapor Extraction	South Valley	NM
Soil Vapor Extraction	Electro-Voice, OU 1	MI	Air Sparging	Prewitt Abandoned Refinery	NM
Soil Vapor Extraction	Kysor Industrial	MI	Bioremediation (Ex situ)	Oklahoma Refining Co.	OK
Soil Vapor Extraction	Peerless Plating	MI	Bioremediation (In situ)	Oklahoma Refining Co.	OK
Soil Vapor Extraction	Springfield Township Dump	MI	Soil Vapor Extraction	Tinker AFB (Soldier Creek Bldg. 3001)	OK
Soil Vapor Extraction	Sturgis Municipal Well Field	MI	Bioremediation (Ex situ)	North Cavalcade Street	TX
Soil Vapor Extraction	ThermoChem, Inc. OU 1	MI	Bioremediation (Ex situ)	Sheridan Disposal Services	TX
Soil Vapor Extraction	Verona Well Field (Thomas Solvent)	MI	Bioremediation (In situ)	French Limited	TX
Soil Vapor Extraction	Verona Well Field, OU 2	MI	In situ Flushing	Koppers/Texarkana	TX
Bioremediation (Ex situ)	Burlington Northern Railroad Tie	MN	In situ Flushing	South Cavalcade Street	TX
Bioremediation (Ex situ)	Joslyn Manufacturing and Supply	MN	Soil Washing	Koppers/Texarkana	TX
Bioremediation (Ex situ)	South Andover Salvage Yard OU 2	MN	Soil Washing	South Cavalcade Street	TX
Soil Vapor Extraction	Long Prairie GW Contamination	MN	Solvent Extraction	United Creosoting	TX
Bioremediation (In situ)	Allied Chem & Iron-ton Coke, OU 2	OH	Soil Vapor Extraction	Petro-Chemical Systems, Inc. OU 2	TX
Soil Washing	United Scrap Lead/SIA	OH	Air Sparging	Petro-Chemical Systems, Inc. OU 2	TX
Soil Washing	Zanesville Well Field	OH			
Soil Vapor Extraction	Miami County Incinerator	OH			
Soil Vapor Extraction	Pristine (ROD Amendment)	OH			

**TABLE 1-2. REMEDIAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES
BY EPA REGION (continued)**

June 1993

<u>TECHNOLOGY</u>	<u>SITE NAME</u>	<u>STATE</u>	<u>TECHNOLOGY</u>	<u>SITE NAME</u>	<u>STATE</u>
<u>REGION 7</u>			<u>REGION 9</u>		
Bioremediation (Ex situ)	Vogel Paint & Wax	IA	Soil Vapor Extraction	Hassayampa Landfill	AZ
Bioremediation (In situ)	People's Natural Gas	IA	Soil Vapor Extraction	Indian Bend Wash, South Area	AZ
Bioremediation (In situ)	Pester Burn Pond	KS	Soil Vapor Extraction	Mesa Area Ground Water Contamination	AZ
In situ Flushing	Pester Burn Pond	KS	Soil Vapor Extraction	Motorola 52nd Street	AZ
Soil Vapor Extraction	Coleman Operable Unit 29th and	KS	Soil Vapor Extraction	Phoenix-Goodyear Airport Area	AZ
In situ Flushing	Lee Chemical	MO	Bioremediation (Ex situ)	J.H. Baxter	CA
Soil Vapor Extraction	Hastings GW Contamination (Col. Ave.)	NE	Bioremediation (Ex situ)	Jasco Chemical Co.	CA
Soil Vapor Extraction	Hastings GW Contamination (Far Marco)	NE	Bioremediation (In situ)	Castle Air Force Base, OU 1	CA
Soil Vapor Extraction	Hastings GW Contamination, Well #3	NE	Bioremediation (In situ)	Koppers Company, Inc. (Oroville)	CA
Soil Vapor Extraction	Lindsay Manufacturing	NE	Soil Washing	FMC (Fresno)	CA
Soil Vapor Extraction	Waverly Groundwater Contamination	NE	Soil Washing	Koppers Company, Inc. (Oroville)	CA
			Soil Washing	Sacramento Army Depot, Oxidation Lagoon	CA
<u>REGION 8</u>			Soil Vapor Extraction	Fairchild Semiconductor (San Jose)	CA
Bioremediation (Ex situ)	Broderick Wood Products OU 2	CO	Soil Vapor Extraction	Fairchild Semiconductor/MTV-I	CA
Bioremediation (In situ)	Broderick Wood Products OU 2	CO	Soil Vapor Extraction	Fairchild Semiconductor/MTV-II	CA
In situ Vitrification	Rocky Mountain Arsenal, M-1 Basins	CO	Soil Vapor Extraction	IBM (San Jose)	CA
Thermal Desorption	Martin Marietta (Denver Aerospace)	CO	Soil Vapor Extraction	Intel, Mountain View	CA
Thermal Desorption	Sand Creek Industrial, OU 5	CO	Soil Vapor Extraction	Intersil/Siemens	CA
Soil Vapor Extraction	Chemical Sales Company, OU 1	CO	Soil Vapor Extraction	Lawrence Livermore National Lab	CA
Soil Vapor Extraction	Martin Marietta (Denver Aerospace)	CO	Soil Vapor Extraction	Monolithic Memories/AMD - Arques	CA
Soil Vapor Extraction	Rocky Flats OU 2, Interim Action	CO	Soil Vapor Extraction	National Semiconductor (MM)	CA
Soil Vapor Extraction	Rocky Mountain Arsenal OU 18	CO	Soil Vapor Extraction	Pacific Coast Pipeline	CA
Soil Vapor Extraction	Sand Creek Industrial OU 1	CO	Soil Vapor Extraction	Purity Oil Sales OU 2	CA
Bioremediation (Ex situ)	Burlington Northern (Somers Plant)	MT	Soil Vapor Extraction	Raytheon, Mountain View	CA
Bioremediation (Ex situ)	Idaho Pole Company	MT	Soil Vapor Extraction	Sacramento Army Depot, Tank 2	CA
Bioremediation (Ex situ)	Libby Ground Water Contamination	MT	Soil Vapor Extraction	Signetics (AMD 901), TRW OU	CA
Bioremediation (In situ)	Burlington Northern (Somers Plant)	MT	Soil Vapor Extraction	Signetics (Advanced Micro Devices)	CA
Bioremediation (In situ)	Idaho Pole Company	MT	Soil Vapor Extraction	Solvent Service	CA
Bioremediation (In situ)	Libby Ground Water Contamination	MT	Soil Vapor Extraction	Spectra Physics, OU 1	CA
In situ Flushing	Idaho Pole Company	MT	Soil Vapor Extraction	Teledyne Semiconductors	CA
Bioremediation (Ex situ)	Wasatch Chemical	UT	Soil Vapor Extraction	Van Waters and Rogers	CA
Chemical Treatment	Portland Cement Co. (Kiln Dust)	UT	Soil Vapor Extraction	Watkins-Johnson	CA
In situ Vitrification	Wasatch Chemical	UT			

TABLE 1-2. REMEDIAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES
BY EPA REGION (continued)

June 1993

<u>TECHNOLOGY</u>	<u>SITE NAME</u>	<u>STATE</u>	<u>TECHNOLOGY</u>	<u>SITE NAME</u>	<u>STATE</u>
<u>REGION 10</u>					
Bioremediation (Ex situ)	McChord AFB Washrack Treatment Area	AK			
Bioremediation (In situ)	Eielson Air Force Base	AK			
Soil Vapor Extraction	Eielson Air Force Base	AK			
In situ Flushing	Union Pacific Railroad Sludge	ID			
Bioremediation (Ex situ)	Umatilla Army Depot Activity	OR			
In situ Flushing	United Chrome Products	OR			
Soil Washing	Gould Battery	OR			
Soil Washing	Naval Submarine Base, Bangor Site A	WA			
Soil Vapor Extraction	Commencement Bay/S. Tacoma Channel	WA			

TABLE 1-3

REMEDIAL ACTIONS: PROJECT STATUS BY INNOVATIVE TREATMENT TECHNOLOGY

Table 1-3 lists the applications of innovative treatment technologies at NPL sites by technology and summarizes the status of the specific application. The symbols used in this table are:

- PD - **In predesign:** A site may be considered to be in predesign if EPA is negotiating the consent decree for the design with the responsible party, the lead agency is preparing the predesign report, the lead agency is contracting for the design firm, or the lead agency is conducting a treatability study or field investigation before beginning actual design work.
- D - **In design:** A site is considered to be in design after the design contractor has begun work.
- D/I - **Design completed but not installed:** This symbol is used if the **design** work had been completed but **installation** work has not yet begun at the time of publication of this report.
- I - **Being installed:** An innovative treatment technology is "being installed" from the time the construction contract has been awarded until the time the treatment system has begun operation. For some technologies, this is a relatively short phase of the project, because such projects are assembled quickly on site. For other technologies, the period of installation lasts several construction seasons.
- O - **Operational.** A treatment technology is operational once it has been constructed and is functional. The length of time required to complete the operation phase depends on such factors as the nature of the technology, the quantity of material to be treated, and the concentrations of the contaminants at the start of treatment.
- C - **Completed:** A treatment technology project is considered to be completed when the operation of the treatment technology ceases. Other site activities still may be planned or underway.

TABLE 1-3. REMEDIAL ACTIONS: PROJECT STATUS
BY INNOVATIVE TREATMENT TECHNOLOGY

June 1993

<u>REGION</u>	<u>BIOREMEDIATION (EX SITU)</u>	<u>STATUS</u>	<u>REGION</u>	<u>BIOREMEDIATION (IN SITU)</u>	<u>STATUS</u>
2	General Motors/Central Foundry Division, OU 1, NY	PD	2	Swope Oil & Chem Co., OU 2, NJ	PD
2	General Motors/Central Foundry Division, OU 2, NY	PD	3	L. A. Clarke & Sons, OU 1 (Soils), VA	PD
3	Ordnance Works Disposal Areas, WV	PD	4	Benfield Industries, NC	PD
4	Benfield Industries, NC	PD	6	Oklahoma Refining Co., OK	PD
5	Galesburg/Koppers, IL	PD	7	Pester Burn Pond, KS	PD
5	Moss-American, WI	PD	7	People's Natural Gas, IA	PD
5	South Andover Salvage Yard OU 2, MN	PD	8	Idaho Pole Company, MT	PD
6	Prewitt Abandoned Refinery, NM	PD	2	Applied Environmental Services, OU 1, NY	D
6	Oklahoma Refining Co., OK	PD	2	Applied Environmental Services (Ground water), NY	D
6	Sheridan Disposal Services, TX	PD	4	Cabot Carbon/Koppers (Ground water), FL	D
8	Idaho Pole Company, MT	PD	4	Cabot Carbon/Koppers, FL	D
9	Jasco Chemical Co., CA	PD	5	Hagen Farm Site, Ground Water Control OU, WI	D
3	L.A. Clarke & Sons, Lagoon Sludge OU, VA	D	5	Allied Chem & Ironton Coke, OU 2, OH	D
3	Whitmoyer Laboratories, OU 3, PA	D	9	Castle Air Force Base, OU 1, CA	D
4	Cabot Carbon/Koppers, FL	D	9	Koppers Company, Inc. (Oroville Plant), CA	D
4	Charles Macon Lagoon, Lagoon #10, NC	D	10	Eielson Air Force Base, AK	D
4	Whitehouse Waste Oil Pits (amended ROD), FL	D	2	FAA Technical Center, NJ	D/I
5	Cliffs/Dow Dump, MD	D	5	Onalaska Municipal Landfill, WI	D/I
6	North Cavalcade Street, TX	D	1	Hocomonco Pond, ESD, MA	I
9	J.H. Baxter, CA	D	8	Broderick Wood Products OU 2, CO	I
10	Umatilla Army Depot Activity, Soil Operable Unit, OR	D	8	Burlington Northern (Somers Plant), MT	I
10	McChord AFB Washrack Treatment Area, AK	D	5	Seymour Recycling (Ground water), IN	O
4	Cape Fear Wood Preserving, NC	D/I	6	Atchison/Santa Fe/Clovis, NM	O
4	Dubose Oil Products, FL	I	6	French Limited, TX	O
8	Broderick Wood Products OU 2, CO	I	8	Libby Ground Water Contamination, MT	O
1	Iron Horse Park, MA	O	5	Seymour Recycling, IN	C
5	Burlington Northern Railroad Tie Treating Plant, MN	O			
5	Joslyn Manufacturing and Supply Co., MN	O			
6	Old Inger Oil Refinery, LA	O			
7	Vogel Paint & Wax, IA	O			
8	Burlington Northern (Somers Plant), MT	O			
8	Wasatch Chemical, UT	O			
8	Libby Ground Water Contamination, MT	O			
4	Brown Wood Preserving, FL	C			

**TABLE 1-3. REMEDIAL ACTIONS: PROJECT STATUS
BY INNOVATIVE TREATMENT TECHNOLOGY (continued)**

June 1993

<u>REGION</u>	<u>DECHLORINATION</u>	<u>STATUS</u>	<u>REGION</u>	<u>SOIL VAPOR EXTRACTION</u>	<u>STATUS</u>
3	Saunders Supply Co, OU 1, VA	PD	1	Tibbetts Road, NH	PD
2	Myers Property, NJ	D	1	Stamina Mills, RI	PD
4	Arlington Blending & Packaging Co., OU 1, TN	D	2	Solvent Savers, NY	PD
4	Smith's Farm Brooks, OU 1, KY	D/I	2	Vestal Water Supply 1-1, NY	PD
2	Wide Beach Development, NY	C	2	Mattiace Petrochemicals Company, OU 1, NY	PD
			2	Swope Oil & Chem Co., OU 2, NJ	PD
			3	Cryochem, OU 3, PA	PD
			3	Bendix, PA	PD
			3	Arrowhead Associates/Scovill, OU 1, VA	PD
			4	Robins AFB, Landfill and Sludge Lagoon, OU 1, GA	PD
			4	Medley Farm, OU 1, SC	PD
			4	SCRDI Bluff Road, SC	PD
			5	MIDCO II, IN	PD
			5	Zanesville Well Field, OH	PD
			5	ThermoChem, Inc. OU 1, MI	PD
			5	City Disposal Corporation Landfill, WI	PD
			5	MIDCO I, IN	PD
			5	Clare Water Supply, MI	PD
			5	Peerless Plating, MI	PD
			5	Electro-Voice, OU 1, MI	PD
			5	Springfield Township Dump, MI	PD
			5	Sturgis Municipal Well Field, MI	PD
			5	American Chemical Services, IN	PD
			6	Prewitt Abandoned Refinery, NM	PD
			6	Petro-Chemical Systems, Inc., OU 2, TX	PD
			7	Coleman Operable Unit 29th and Mead, KS	PD
			8	Rocky Flats OU 2, Interim Remedial Action Plan, CO	PD
			9	Motorola 52nd Street, AZ	PD
			9	Indian Bend Wash, South Area, OU 1, AZ	PD
			9	Purity Oil Sales OU 2, CA	PD
			9	Lawrence Livermore National Laboratory, CA	PD
			1	Silresim, MA	D
			1	Kellogg-Deering Well Field, CT	D
			1	Tinkham Garage, NH	D
			2	Applied Environmental Services, OU 1, NY	D
			2	Garden State Cleaners, NJ	D
			2	Circuitron Corporation, OU 1, NY	D
			2	Pasley Solvents and Chemicals, Inc., NY	D
<u>REGION</u>	<u>IN SITU FLUSHING</u>	<u>STATUS</u>			
1	Tibbetts Road, NH	PD			
2	Byron Barrel & Drum, NY	PD			
4	Ciba-Geigy Corp. (MacIntosh Plant) OU 2, AL	PD			
4	Ciba-Geigy (MacIntosh Plant) OU 4, AL	PD			
6	Koppers/Texarkana, TX	PD			
7	Pester Burn Pond, KS	PD			
8	Idaho Pole Company, MT	PD			
10	Union Pacific Railroad Sludge Pit, ID	PD			
2	Vineland Chemical, OU 1 and OU 2, NJ	D			
2	Pasley Solvents and Chemicals, Inc., NY	D			
2	Naval Air Engineering Center OU 7, interim action, NJ	D			
3	L. A. Clarke & Sons, OU 1 (Soils), VA	D			
3	U.S. Titanium, VA	D			
5	Rasmussen Dump, MI	D			
5	Ninth Avenue Dump, IN	D			
6	South Cavalcade Street, TX	D			
4	JADCO-Hughes, NC	I			
7	Lee Chemical, MO	I			
2	Lipari Landfill, NJ	O			
10	United Chrome Products, OR	O			
<u>REGION</u>	<u>IN SITU VITRIFICATION</u>	<u>STATUS</u>			
5	Ionia City Landfill, MI	D			
8	Rocky Mountain Arsenal, M-1 Basins (OU 16), CO	D			
8	Wasatch Chemical, UT	D			

TABLE 1-3. REMEDIAL ACTIONS: PROJECT STATUS
BY INNOVATIVE TREATMENT TECHNOLOGY (continued)

June 1993

REGION	SOIL VAPOR EXTRACTION (continued)	STATUS
2	A O Polymer, Soil treatment phase, NJ	D
2	Genzale Plating Company, OU 1, NY	D
2	South Jersey Clothing, NJ	D
3	Defense General Supply Center, OU 5, VA	D
3	Lord-Shope Landfill, PA	D
4	Charles Macon Lagoon, Lagoon #7, OU 1, NC	D
4	JADCO-Hughes, NC	D
5	Hagen Farm, WI	D
5	Fisher Calo Chem, IN	D
5	Kysor Industrial, MI	D
5	Wayne Waste Reclamation, IN	D
5	Acme Solvent Reclaiming, Inc. OU 2, IL	D
5	Main Street Well Field, IN	D
5	Enviro. Conservation and Chemical (ROD Amendment)	D
5	Chem Central, MI	D
5	Miami County Incinerator, OH	D
5	Pristine (ROD Amendment), OH	D
5	Muskego Sanitary Landfill, Interim Action OU 1, WI	D
6	Tinker AFB (Soldier Creek Bldg. 3001), OK	D
7	Hastings GW Contamination (Colorado Ave), NE	D
7	Hastings GW Contamination (Far-Mar Co.), NE	D
7	Lindsay Manufacturing, NE	D
8	Martin Marietta (Denver Aerospace), CO	D
8	Chemical Sales Company, OU 1, CO	D
9	Hassayampa Landfill, AZ	D
9	Watkins-Johnson, CA	D
9	Pacific Coast Pipeline, CA	D
9	Intel, Mountain View, CA	D
9	Fairchild Semiconductor/MTV-I, CA	D
9	Raytheon, Mountain View, CA	D
9	Fairchild Semiconductor/MTV-II, CA	D
10	Eielson Air Force Base, AK	D
2	FAA Technical Center, NJ	D/I
4	Carrier Air Conditioning, TN**	D/I
5	Long Prairie Groundwater Contamination, MN	D/I
5	Wausau Groundwater Contamination, WI	D/I
6	South Valley, NM	D/I

REGION	SOIL VAPOR EXTRACTION (continued)	STATUS
1	Mottolo Pig Farm, NH	I
1	South Municipal Water Supply Well, NH	I
3	Raymark, PA	I
9	Signetics (AMD 901), TRW OU, CA	I
1	Groveland Wells, MA	O
1	Wells G&H OU 1, MA	O
2	SMS Instruments (Deer Park), NY	O
3	Tyson's Dump, PA	O
3	Henderson Road, PA	O
5	Verona Well Field, OU 2, MI	O
5	Seymour Recycling, IN	O
7	Hastings GW Contamination, Well No. 3, NE	O
7	Waverly Groundwater Contamination, NE	O
8	Sand Creek Industrial OU 1, CO	O
9	IBM (San Jose), CA	O
9	Intersil/Siemens, CA	O
9	Mesa Area Ground Water Contamination, AZ	O
9	Phoenix-Goodyear Airport Area (North & South Fac), MI	O
9	Spectra Physics, OU 1, CA	O
9	National Semiconductor (Monolithic Memories), CA	O
9	Solvent Service, CA	O
9	Teledyne Semiconductors, CA	O
9	Signetics (Advanced Micro Devices 901), CA	O
9	Monolithic Memories/AMD - Arques, Subunit 2, CA	O
9	Van Waters and Rogers, CA	O
10	Commencement Bay/S. Tacoma Channel/Well 12A, WA	O
2	Upjohn Manufacturing Co., PR	C
4	Hollingsworth Solderless, FL	C
5	Verona Well Field (Thomas Solvent/Raymond Road),	C
8	Rocky Mountain Arsenal OU 18, interim response, CO	C
9	Fairchild Semiconductor (San Jose), CA	C
9	Sacramento Army Depot, Tank 2 OU, CA	C
	MI	

TABLE 1-3. REMEDIAL ACTIONS: PROJECT STATUS
BY INNOVATIVE TREATMENT TECHNOLOGY (continued)

June 1993

<u>REGION</u>	<u>SOIL WASHING</u>	<u>STATUS</u>
2	Ewan Property, NJ	PD
4	Benfield Industries, NC	PD
5	Moss-American, WI	PD
5	Zanesville Well Field, OH	PD
6	Koppers/Texarkana, TX	PD
9	FMC (Fresno), CA	PD
10	Naval Submarine Base, Bangor Site A, OU 1, WA	PD
2	Myers Property, NJ	D
2	Vineland Chemical, OU 1 and OU 2, NJ	D
2	GE Wiring Devices, PR	D
4	Cabot Carbon/Koppers, FL	D
4	Whitehouse Waste Oil Pits (amended ROD), FL	D
5	United Scrap Lead/SIA, OH	D
6	Arkwood, AR	D
6	South Cavalcade Street, TX	D
9	Koppers Company, Inc. (Oroville Plant), CA	D
9	Sacramento Army Depot, Oxidation Lagoons OU, CA	D
2	King of Prussia, NJ	D/I
4	Cape Fear Wood Preserving, NC	D/I
10	Gould Battery, OR	0

<u>REGION</u>	<u>SOLVENT EXTRACTION</u>	<u>STATUS</u>
2	Ewan Property, NJ	PD
1	Norwood PCBs, MA	D
1	O'Connor, ME	D
4	Carolina Transformer, NC	D
6	United Creosoting, TX	D

<u>REGION</u>	<u>THERMAL DESORPTION</u>	<u>STATUS</u>
2	Reich Farms, NJ	PD
2	Solvent Savers, NY	PD

<u>REGION</u>	<u>THERMAL DESORPTION (continued)</u>	<u>STATUS</u>
2	Industrial Latex, OU 1, NJ	PD
3	Saunders Supply Co, OU 1, VA	PD
4	Ciba-Geigy (MacIntosh Plant) OU 4, AL	PD
4	Sangamo/Twelve-Mile/Hartwell PCB, OU 1, SC	PD
4	Aberdeen Pesticide Dumps, OU 4, NC	PD
5	American Chemical Services, IN	PD
8	Sand Creek Industrial, OU 5, CO	PD
2	Sarney Farm, NY	D
2	Fulton Terminals, Soil Treatment, NY	D
2	American Thermostat, NY	D
2	Claremont Polychemical - Soil Remedy, NY	D
4	Potter's Septic Tank Service Pits, NC	D
4	Ciba-Geigy Corp. (MacIntosh Plant) OU 2, AL	D
4	Arlington Blending & Packaging Co., OU 1, TN	D
4	Wamchem, SC	D
5	Acme Solvent Reclaiming, Inc. OU 2, IL	D
5	Carter Industries, MI	D
8	Martin Marietta (Denver Aerospace), CO	D
1	Union Chemical Co., OU 1, ME	D/I
2	Lipari Landfill Marsh Sediment, NJ	D/I
3	U.S.A. Letterkenny SE Area, OU1, PA	D/I
4	Smith's Farm Brooks, OU 1, KY	D/I
1	Re-Solve, MA	I
2	Metaltec/Aerosystems, OU 1 - Soil Treatment, NJ	I
2	Waldick Aerospace Devices, NJ	O
5	Anderson Development (ROD Amendment), MI	O
1	Cannon Engineering/Bridgewater, MA	C
1	Ottati & Goss, NH	C
1	McKin, ME	C
5	Outboard Marine/Waukegan Harbor, OU 3, IL	C

<u>REGION</u>	<u>OTHER</u>	<u>STATUS</u>
3	Brown's Battery Breaking Site, OU 2, PA	PD
3	Brown's Battery Breaking Site, OU 2, PA	PD
3	Tonolli Corporation, PA	PD

TABLE 1-3. REMEDIAL ACTIONS: PROJECT STATUS
BY INNOVATIVE TREATMENT TECHNOLOGY (continued)

June 1993

<u>REGION</u>	<u>OTHER (continued)</u>	<u>STATUS</u>
3	Brodhead Creek, OU 1, PA	PD
6	Petro-Chemical Systems, Inc., OU 2, TX	PD
6	Prewitt Abandoned Refinery, NM	PD
2	Applied Environmental Services, OU 1, NY	D
1	South Municipal Water Supply Well, NH	I

TABLE 1-4

REMEDIAL ACTIONS: ESTABLISHED TREATMENT TECHNOLOGIES BY FISCAL YEAR

Table 1-4 shows NPL sites at which established treatment technologies have been selected as part of the remedy. Established treatment technologies include: incineration, solidification/stabilization, and others. The sites are ordered by fiscal year to give some initial information on the status of implementation: in general, earlier RODs have progressed furthest in design and construction.

TABLE 1-4
REMEDIAL ACTIONS: ESTABLISHED TREATMENT TECHNOLOGIES BY FISCAL YEAR

June 1993

On-Site Incineration

FY	REGION	SITE NAME	STATE
85	2	Bog Creek Farm	NJ
85	2	Bridgeport Rental & Oil	NJ
85	5	ACME Solvent	IL
85	6	MOTCO	TX
<hr/>			
86	1	Baird & McGuire	MA
86	4	Mowbray Engineering	AL
86	5	LaSalle Electrical Utilities	IL
86	5	Arrowhead Refinery	MN
86	5	Fields Brook	OH
86	6	Sikes Disposal Pit	TX
<hr/>			
87	1	Ottati & Goss	NH
87	1	Davis Liquid Waste	RI
87	4	Tower Chemical	FL
87	4	Geiger/C&M Oil	SC
87	5	Rose Township Dump	MI
87	5	Laskin/Poplar Oil	OH
87	6	Bayou Bonfouca	LA
87	6	Cleve Reber	LA
<hr/>			
88	1	Rose Disposal Pit	MA
88	2	Lipari Landfill	NJ
88	2	Love Canal	NY
88	3	Delaware Sand & Gravel	DE
88	3	Southern Maryland Wood Treating	MD
88	3	Drake Chemical/Phase III	PA
88	3	Ordnance Works Disposal	WV
88	4	Zellwood Groundwater	FL
88	5	LaSalle Electrical Utilities	IL
88	5	Fort Wayne Reduction	IN
88	5	Forest Waste Products	MI
88	5	Pristine	OH

On-Site Incineration (continued)

FY	REGION	SITE NAME	STATE
88	5	Summit National Liquid Disposal	OH
88	6	Old Midland Products	AR
88	6	Brio Refining	TX
88	7	Times Beach	MO
88	8	Broderick Wood Products	CO
<hr/>			
89	1	Baird and McGuire	MA
89	1	Wells G&H	MA
89	2	Bog Creek Farm	NJ
89	2	De Rewal Chemical*	NJ
89	3	Douglasville Disposal	PA
89	4	Smith's Farm Brooks*	KY
89	4	Aberdeen Pesticide Dumps/ Fairway	NC
89	4	Celanese*	NC
89	4	American Creosote Works	TN
89	5	Ninth Avenue Dump	IN
89	5	New Brighton/Arden Hills	MN
89	5	Big D Campground	OH
89	5	Laskin/Poplar Oil	OH
<hr/>			
90	1	New Bedford*	MA
90	2	Sarney Farm	NY
90	3	M.W. Manufacturing*	PA
90	5	Sangamo/Crab Orchard* National Wildlife Refuge	IL
90	5	Fisher Calo	IN
90	5	Bofors Nobel	MI
90	5	Springfield Township Dump*	MI
90	5	Pristine (Amendment)	OH
90	5	University of Minnesota	MN
90	6	Vertac	AR
90	6	Texarkana Wood Preserving	TX
90	7	Missouri Electric Works	MO

* Residuals to be treated with solidification/stabilization.

TABLE 1-4 (continued)
 REMEDIAL ACTIONS: ESTABLISHED TREATMENT TECHNOLOGIES BY FISCAL YEAR

September 1993

On-Site Incineration (continued)

FY	REGION	SITE NAME	STATE
90	7	Hastings Groundwater Contamination (East Industrial Park)	NE
90	10	FMC Yakima Pit	WA

91	3	Whitmoyer Labs, Inc. OU3	PA
91	3	Eastern Diversified Metals	PA
91	4	Ciba Geigy Corp.	AL
91	5	Allied Chem & Ironton Coke	OH

92	4	Alabama Army Ammunition Plant (Operable Unit 1)	AL
92	5	Savanna Army Depot	IL
92	6	Gulf Coast Vacuum Services (Operable Unit 1)	LA

Off Site Incineration

FY	REGION	SITE NAME	STATE
84	5	Berlin & Farro Liquid Incineration	MI
84	5	Laskin/Poplar Oil	OH
84	10	Western Processing Phase I	WA

85	2	Swope Oil & Chemical	NJ
85	5	Byron/Johnson Salvage Yard	IL
85	6	Triangle Chemical	TX
85	8	Woodbury Chemical	CO
86	3	Drake Chemical/Phase II	PA

Off-Site Incineration (continued)

FY	REGION	SITE NAME	STATE
86	3	Westline	PA
86	5	Metamora Landfill	MI
86	5	Spiegelberg Landfill	MI
86	7	Ellisville Area/Bliss	MO

87	2	Williams Property	NJ
87	4	Sodyeco	NC
87	6	Sand Springs Petrochemical Complex	OK

88	1	Cannon Engineering/Plymouth	MA
88	2	Ewan Property	NJ
88	2	Reich Farms	NJ
88	2	Brewster Well Field	NY
88	3	Wildcat Landfill	DE
88	3	Berks Sand Pit	PA
88	3	Douglassville Disposal	PA
88	3	Fike Chemical	WV
88	5	Belvidere Municipal Landfill #1	IL
88	6	S. Calvacade St.	TX
88	7	Minker/Stout/Romaine Creek (R&S)	MO
88	7	Syntex	MO

89	1	W.R. Grace (Acton Plant)	MA
89	1	O'Connor	ME
89	1	Pinette's Salvage Yard	ME
89	2	Claremont Polychemical	NY
89	3	M.W. Manufacturing	PA
89	3	Whitmoyer Laboratories	PA
89	4	Newsom Brothers Old Reichold	MS
89	5	Cross Brothers Pail	IL
89	5	Outboard Marine/Waukegan Harbor	IL

* Residuals to be treated with solidification/stabilization.

TABLE 1-4 (continued)
REMEDIAL ACTIONS: ESTABLISHED TREATMENT TECHNOLOGIES BY FISCAL YEAR

June 1993

Off-Site Incineration (continued)

FY	REGION	SITE NAME	STATE
89	5	Wedzeb	IN
89	5	Cliff/Dow Dump	MI
89	5	AlSCO Anaconda	OH
89	6	United Creosoting	TX
89	8	Woodbury Chemical	CO
<hr/>			
90	1	Beacon Heights Landfill	CT
90	1	Kearsarge Metallurgical	NH
90	2	FAA Technical Center	NJ
90	2	Hooker Chemical-Ruco Polymer	NJ
90	2	Sayreville landfill	NJ
90	2	Mattiace Petrochemicals	NY
90	2	Sealand Restoration	NY
90	3	Greenwood Chemical*	VA
90	6	Arkwood	AR
90	6	Jacksonville Municipal Landfill	AR
90	6	Rogers Road Municipal Landfill	AR
90	6	Hardage/Criner (Amendment)	OK
90	7	Fairfield Coal Gasification Plant	IA
90	7	Shenandoah Stables	MO
90	8	Martin Marietta (Denver Aerospace)	CO
90	8	Sand Creek Industrial	CO
90	8	Ogden Defense Depot	UT
<hr/>			
91	1	Union Chemical	ME
91	2	Curcio Scrap Metal	NJ
91	2	Swope Oil	NJ
91	2	Waldick Aerospace Devices, Inc.	NJ
91	2	Circuitron	NY
91	2	Mattiace Petrochemical	NY
91	3	Brodhead Creek	PA
91	3	Eastern Diversified Metals	PA
91	3	Dixie Cavern County Landfill	VA

Off-Site Incineration (continued)

FY	REGION	SITE NAME	STATE
91	4	Aberdeen Pesticide Dumps (Amendment)	NC
91	4	Wrigley Charcoal	TN
91	5	Acme Solvent Reclaiming Inc.	IL
91	5	Main Street Wellfield	IN
91	5	Thermo Chem	MI
91	5	Carter Industries	MI
91	5	Summit National Liquid Disposal Service (Amendment)	OH
91	6	Petrochemical (Turtle-Bayou)	TX
91	7	Peoples Natural Gas	IA
91	7	Ellisville Area Site	MO
91	7	Ellisville Area (Amendment)	MO
91	7	Kem-Pest Laboratories	MO
91	8	Broderick Wood Products	CO
91	8	Hill AFB	UT
91	9	Advanced Micro Devices Inc.	CA
91	10	Commencement Bay - Nearshore/Tideflats	WA
91	10	Northwest Transformer - Mission Pole	WA
<hr/>			
92	2	Ellis Property	NJ
92	3	Fike Chemical	WV
92	5	American Chemical Services	IN
92	8	Ogden Defense Depot (Operable Unit 3)	UT
92	9	Westinghouse Electric (Sunnyvale Plant)	CA
92	10	Pacific Hide & Fur Recycling (Amendment)	ID
92	10	U.S. DOE Idaho National Engineering Lab (Operable Unit 23)	ID

* Residuals to be treated with solidification/stabilization.

TABLE 1-4 (continued)
 REMEDIAL ACTIONS: ESTABLISHED TREATMENT TECHNOLOGIES BY FISCAL YEAR

Solidification/Stabilization

FY	REGION	SITE NAME	STATE
82	3	Bruin Lagoon	PA
84	6	Bioecology Systems	TX
85	4	General Refining	GA
85	4	Davie Landfill	FL
85	10	Western Processing/Phase II	WA
86	2	Marathon Battery	NY
86	3	Bruin Lagoon	PA
86	4	Pepper's Steel & Alloy	FL
86	4	Sapp Battery Salvage	FL
86	5	Burrows Sanitation	MI
86	5	Forest Waste Products	MI
87	1	Davis Liquid Waste	RI
87	2	Chemical Control	NJ
87	2	Myers Property	NJ
87	2	Waldick Aerospace	NJ
87	4	Gold Coast	FL
87	4	Geiger/C&M Oil	SC
87	4	Independent Nail	SC
87	4	Palmetto Wood Preserving	SC
87	5	Liquid Disposal	MI
87	5	Northern Engraving	WI
87	6	Gurley Pit	AR
87	6	Mid-South Wood	AR
87	6	Cleve Reber	LA
87	6	Sand Spring Petrochemical Complex	OK
88	1	Charles George Land Reclamation	MA

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
88	2	Love Canal	NY
88	2	Marathon Battery	NY
88	2	York Oil	NY
88	3	Alladin Plating	PA
88	3	Fike Chemical	WV
88	4	Brown Wood Preserving	FL
88	4	Flowood	MS
88	4	Chemtronics	NC
88	5	Velsicol Chemical	IL
88	5	Mid-State Disposal Landfill	WI
88	6	Industrial Waste Control	AR
88	6	Bailey Waste Disposal	TX
88	6	Brio Refining	TX
88	6	French Limited	TX
88	7	Midwest Manufacturing/ North Farm	IA
88	9	Selma Pressure Treating	CA
88	10	Pacific Hide & Fur Recycling	ID
88	10	Gould	OR
88	10	Commencement Bay/NTF	WA
88	10	Frontier Hard Chrome	WA
89	1	Sullivan's Ledge	MA
89	1	W.R. Grace (Acton Plant)	MA
89	1	O'Connor	ME
89	2	DeRewal Chemical	NJ
89	2	Marathon Battery	NY
89	3	Craig Farm	PA
89	3	Douglassville Disposal	PA
89	3	Hebelka Auto Salvage Yard	PA
89	3	Ordnance Works Disposal	WV
89	4	Kassouf-Kimerling Battery	FL
89	4	Smith Farm Brooks	KY
89	4	Cape Fear Wood Preserving	NC
89	4	Celanese	NC
89	4	Amnicola Dump	TN

TABLE 1-4 (continued)
 REMEDIAL ACTIONS: ESTABLISHED TREATMENT TECHNOLOGIES BY FISCAL YEAR

June 1993

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
89	5	MIDCO I	IN
89	5	MIDCO II	IN
89	5	Auto Ion Chemicals	MI
89	6	Pesses Chemical	TX
89	6	Sheridan Disposal Services	TX
89	7	Vogel Paint & Wax	IA
89	9	Koppers (Oroville Plant)	CA
89	9	Purity Oil Sales	CA
<hr/>			
90	1	New Bedford	MA
90	2	Roebbing Steel	NJ
90	3	M.W. Manufacturing	PA
90	3	C&R Battery	VA
90	3	Greenwood Chemical	VA
90	4	62nd Street Dump	FL
90	4	Cabot/Koppers	FL
90	4	Coleman-Evans Wood Preserving (Amendment)	FL
90	4	Kassourf-Kimerling Battery Disposal	FL
90	4	Schuylkill Metal	FL
90	4	Yellow Wate Road	FL
90	4	Zellwood Groundwater Contamination (Amendment)	FL
90	5	Sangamo/Crab Orchard National Wildlife Refuge	IL
90	5	Wayne Waste Oil	IN
90	5	Springfield Township Dump	MI
90	5	Oconomowoc Electroplating	WI
90	6	Jacksonville Municipal Landfill	AR
90	6	Rogers Road Municipal Landfill	AR
90	7	Shenandoah Stables	MO
90	7	Hastings Groundwater Contamination (East Industrial Park)	NE
90	8	Martin Marietta (Denver Aerospace)	CO

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
90	8	Rocky Mountain Arsenal (OU 17)	CO
90	9	J.H. Baxter	CA
90	10	Teledyne Wah Chang Albany (TWCA)	OR
<hr/>			
91	1	Silresin Chemical	MA
91	1	Sullivan's Ledge	MA
91	1	Union Chemical	MA
91	2	Asbestos Dump	NJ
91	2	Nascolite Corp.	NJ
91	2	NL Industries	NJ
91	2	Roebbing Steel	NJ
91	2	Waldick Aerospace Services Inc.	NJ
91	2	White Chemical Corp.	NJ
91	3	Halby Chemical	DE
91	3	Mid-Atlantic Wood Preservers	MD
91	3	Eastern Diversified Metals	PA
91	3	Hebelka Auto Salvage Yard	PA
91	3	Whitmoyer Lab (OU3)	PA
91	3	Whitmoyer Lab (OU2)	PA
91	3	U.S.A. Letterkenny SE	PA
91	3	First Piedmont Quarry 719	VA
91	3	Saunders Supply	VA
91	4	Interstate Lead Co.	AL
91	4	USAF Robins Air Force Base	GA
91	4	Maxey Flats Nuclear Disposal	KY
91	4	Golden Strip Septic Tank	SC
91	4	Aberdeen Pesticide Dump (Amendment)	NC
91	4	Carolina Transformer	NC
91	4	Arlington Blending and Packaging Co.	TN
91	4	Oak Ridge OU3	TN
91	4	Wrigley Charcoal	TN
91	5	Acme Solvents	IL
91	5	Carter Industries	MI
91	6	Cimarron Mining Corp.	NM

TABLE 1-4 (continued)
REMEDIAL ACTIONS: ESTABLISHED TREATMENT TECHNOLOGIES BY FISCAL YEAR

June 1993

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
91	7	IE Dupont de Nemours & Co., Inc.	IA
91	7	Mid-America Tanning	IA
91	7	Shaw Avenue Dump	IA
91	8	Anaconda Co. Smelter	MT
91	9	FMC (Fresno Plant)	CA
91	9	Valley Wood Preserving	CA
92	1	PSC Resources	MA
92	2	Cosden Chemical Coatings	NJ
92	2	Facet Enterprises	NY
92	2	Preferred Plating	NY
92	3	Abex	VA
92	3	C & D Recycling	PA
92	3	Fike Chemical	WV
92	3	Paoli Rail Yard	PA
92	3	Rhinehart Tire Fire Dump	VA
92	3	Tonolli	PA
92	4	Agrico Chemical	FL
92	4	Ciba-Geigy (McIntosh Plant)	AL
92	4	Florida Steel	FL
92	4	JFD Electronics/Channel Masters	NC
92	4	Marine Corps Logistics Base	GA
92	4	Savannah River (USDOE) (Operable Unit 1)	SC
92	4	Whitehouse Waste Oil Pits (Amendment)	FL
92	5	Electrovoice	MI
92	5	H. Brown Company	MI
92	5	Peerless Plating	MI
92	5	Savanna Army Depot	IL
92	5	Spickler Landfill	WI
92	5	Tar Lake	MI
92	6	Cal West Metals	NM
92	6	Double Eagle Refinery	OK
92	6	Fourth Street Abandoned Refinery	OK

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
92	6	Gulf Coast Vacuum Services (Operable Unit 1)	LA
92	6	Oklahoma Refining	OK
92	8	Broderick Wood Products	CO
92	8	Denver Radium (Operable Unit 8)	CO
92	8	Portland Cement (Kiln Dust #2 & #3)	UT
92	8	Rocky Flats (USDOE) (Operable Unit 4)	CO
92	8	Silver Bow Creek Butte Area	MT
92	9	Rhone-Poulenc/Zoecon	CA
92	10	Bunker Hill Mining and Metallurgical Complex	ID
92	10	Pacific Hide & Fur Recycling (Amendment)	ID
92	10	U.S. DOE Idaho National Engineering Lab (Operable Unit 22)	ID

Other

FY	REGION	SITE NAME	STATE	TECHNOLOGY
85	6	Triangle Chemical	TX	Soil Aeration
87	3	West Virginia Ordnance	WV	In situ Flammings
88	3	Bendix Flight System	PA	Soil Aeration
88	7	Arkansas City Dump	KS	Chemical
89	9	Intel, Mountain View	CA	Soil Aeration
89	9	Raytheon, Mountain View	CA	Soil Aeration
90	4	Howe Valley Landfill	KY	Soil Aeration
92	3	Fike Chemical	WV	Neutralization
92	6	Double Eagle Refinery	OK	Neutralization
92	6	Fourth Street Abandoned Refinery	OK	Neutralization
92	6	Oklahoma Refining	OK	Neutralization

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TABLE 1-5

REMEDIAL ACTIONS: TREATMENT TRAINS WITH INNOVATIVE TREATMENT TECHNOLOGIES

Table 1-5 lists the sites at which innovative treatment technologies are used together with established or other innovative treatment technologies in treatment "trains." Technologies may be combined to reduce the volume of material requiring further treatment, to prevent the emission of volatile contaminants during excavation and mixing, or to address multiple contaminants in a single medium.

TABLE 1-5. REMEDIAL ACTIONS: TREATMENT TRAINS WITH INNOVATIVE TECHNOLOGIES

June 1993

Dechlorination Followed by

Soil Washing	Myers Property	NJ
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Ex Situ Bioremediation Followed by

Solidification/Stabilization	Whitmoyer Laboratories, OU 3	PA
Solidification/Stabilization	J. H. Baxter	CA
Solidification/Stabilization	Cape Fear Wood Preserving	NC

In Situ Flushing Followed by

In Situ Bioremediation	LA Clarke & Sons	VA
In Situ Bioremediation	Pester Burn Pond	KS

Soil Vapor Extraction Followed by

In Situ Bioremediation	Swope Oil & Chemical Co.	NJ
In Situ Flushing	JADCO - Hughes	NC
In Situ Flushing	Pasley Solvents and Chemicals, Inc.	NY
Solidification/Stabilization	Genzale Plating Company, OU 1	NY
Soil Washing	Zanesville Well Field	OH

Soil Washing Followed by

Bioremediation	American Creosote	FL
Bioremediation	Cabot Carbon/Koppers	FL
Bioremediation	Whitehouse Waste Oil Pits	FL
Bioremediation	Benfield Industries	NC
Bioremediation	Cape Fear Wood Preserving	NC
Bioremediation	Moss-American	WI
Bioremediation	Koppers (Oroville)	CA

Soil Washing Followed by (continued)

Incineration	Arkwood	AR
Incineration	South Cavalcade Street	TX
Incineration	Sand Creek, OU 5	CO
Solidification/Stabilization	FMC (Fresno)	CA

Solvent Extraction Followed by

Incineration	United Cresoting	TX
Soil Washing	Ewan Property	NJ
Solidification/Stabilization	O'Connor	ME

Thermal Desorption Followed by

Dechlorination	Resolve	MA
Dechlorination	Arlington Blending & Packaging Co., OU 1	TN
Dechlorination	Smith's Farm Brooks, OU 1	KY
Incineration of Organic Vapors	Sarney Farm	NY
Incineration of Organic Vapors	Outboard Marine/Waukegan Harbor	IL
Incineration of Organic Vapors	Carter Industries	MI
Incineration of Organic Vapors	University of Minnesota	MN
Incineration of Organic Vapors	Martin Marietta (Denver Aerospace)	CO
Solidification/Stabilization	Waldick Aerospace Devices	NJ
Solidification/Stabilization	USA Letterkenny (SE Area, OU 1)	PA
Solidification/Stabilization	Acme Solvent Reclaiming, Inc., OU 2	IL
Solidification/Stabilization	Carter Industries	MI
Solidification/Stabilization	Martin Marietta (Denver Aerospace)	CO

TABLE 1-6

REMEDIAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS

Table 1-6 provides summary information on the performance and operating parameters for applications of innovative treatment technologies that have been completed at remedial sites. It is intended to supplement, not replace, the information included in tables 1-1, 1-2, and 1-3.

TABLE 1-6
REMEDIAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
1	Cannon Engineering/MA 5/90 to 10/90	Thermal soil aeration/ Canonie Environmental Services Corp., Porter, IN	Soil (11,300 tons)	Criteria: 0.1 ppm - TCE, DCE, PCE 0.2 ppm - Toluene, Xylene 0.5 ppm - Vinyl chloride SVOCs - 3ppm (total) Input 500 - 3,000 ppm (Total VOCs) Output - <0.025 ppm (Total VOCs)	Continuous operation 40 tons/hr 450 - 500° F Moisture content before treatment - 5% - 25% moisture Additives - dry soil (to reduce moisture content)	Excavation Screening Mixing Dewatering	Residuals from air pollution control - treated on site, disposed of off site Wastewater - treated on site, disposed of off site	The waste feed size limitation for the equipment, 1.875 inches, was an important consideration. More information is available in the RA report available from Region 1.
1	McKin, ME 7/86 to 2/87	Thermal desorption/ Canonie Env. Services Corp., Porter, IN	Soil (11,500 cy to a depth of 10 ft.)	VOCs Criteria: 0.1 ppm TCE Input: up to 1,000 ppm TCE Output: 0.1 ppm	Continuous operation 6-8 minutes retention time 300°F	Excavation	Soils - Solidified and disposed onsite Vapors - Air carbon capture	
1	Ottati & Goss, NH 6/89 to 9/89	Thermal desorption/ Canonie Engineering	Soil (6,000 cy)	TCE, PCE, DCA, Benzene Criteria: 1 ppm - Total VOCs and <100 ppb - Each individual VOC Output: <1ppm - Total VOCs	Batch process	Excavation Screening	Carbon from air pollution control unit regenerated offsite	For more information on this project, see the close out report available from Region 1.

TABLE 1-6
REMEDIAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
2	Wide Beach Development, NY 9/90 to 9/91	APEG dechlorination/ Soil Tech Denver, CO	Soil (40,000 cy)	Criteria: PCB - <10 ppm (1 composite sample/day) Input - 10 to 100 ppm PCB Output - 2 ppm PCB	Continuous process 8 tons/hour 200° - 580°C (450° - 1100°F) Ambient pH and moisture Additives - Alkaline polyethylene glycol (APEG)	Excavation Screening Staging	Treated soil - disposed of on site	If on-site disposal is planned, perform tests of the treated material appropriate to intended use. For further information on this dechlorination project, see the Demonstration Test Report produced by Region 2, EPA.
2	Upjohn Manufacturing Company, PR 1/83 to 3/88	Soil Vapor Extraction Terra Vac, Inc. Costa Mesa, CA	Soil (16,000 sq ft to approximately 100 ft deep)	Criteria: Initially: Undefined, end point of treatment was subject to long debate. Final criteria: Carbon tetrachloride (in exhaust stacks) - nondetectable for three consecutive months Initial concentrations - 70 ppm (carbon tetrachloride to air) Final concentrations - nondetect (<0.002 ppm)	Ambient conditions		Discharge of soil vapors through 30-ft stack	For further information on this application, see the Applications Analysis Report for the Terra Vac In situ Vacuum Extraction System (EPA/540/A5-89/003).

TABLE 1-6
REMEDIAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
4	Brown Wood Preserving, FL 10/88 to 12/91	Land treatment/ Remediation Technologies, Seattle, Washington	Soil/pond sediment (7,500 cy)	Criteria: 100 ppm total carcinogenic PAHs as sampled on 8 subplots on each lift Input - 800 to 2,000 ppm total creosote contaminants Output - 10 to 80 ppm total carcinogenic indicators	Retention time - 3 to 6 months Additives - water and nutrients	Excavation Screening Tilling	Treated material vegetated with grass (no cap)	Further information on this project is available from the <u>Remedial Action Close Out Report</u> . The vendor, RETEC, is expected to prepare a paper.
4	Palmetto Wood Preserving, SC 9/28/88 to 2/8/89	Chemical treatment and soil washing Reduction of hexavalent chromium to trivalent chromium En-site (ERCS contractor) Atlanta, GA	Soil (13,000 cy)	Health-based criteria - Actual concentrations unknown Input: Arsenic - 2 to 6,200 ppm Chromium - 4 to 6,200 ppm Output: Arsenic - less than 1 ppm Chromium - 627 ppm	Soil - Batch process Treatment for aqueous waste from soil washing - 25 gallons per minute pH - 2 to 9	Neutralization Mixing Dewatering	Soil - solidified and replaced on site Wastewater - permitted discharge to the sewer line Sludges - off site disposal	(1) Used sodium meta- phosphate to lower pH to 2.0 and wash the Chromium from the soil, (2) separated the soil and solution, (3) solidified the soils, and (4) used the ferrous ion method of reduction to precipitate the chromium from solution in trivalent form. This treatment system is unique in the method of generating ferrous ion for the reducing step. The waste stream passed through an electrolytic cell containing consumable steel electrodes where the ferrous ions were electrically introduced into the waste stream.

TABLE 1-6
REMEDIAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
4 #	Hollingsworth Solderless, FL 1/91 to 7/91	Soil vapor extraction EBASCO	Soil 60 cy (down to 7 feet deep)	TCE, vinyl chloride Target: total VOCs 1 ppm	In situ	None required	Air emissions vented to atmosphere	Design specifications were very critical. Need to pay close attention to design specifications
5	Seymour Recycling, IN Summer - 1990 August-October, 1986 January-February, 1987	In situ soil bioremediation ABB Environmental Services	Soil (12 acres to 10 ft deep, approximately 43,500 cy)	54 contaminants present, including TCE, TCA, and Carbon Tetrachloride No standards or criteria for this OU in ROD	Additives - nitrogen, phosphorus, potassium, sulfur as fertilizer (200,000 gallons of nutrients added)	Tilling	Capping in place	The soil became saturated quickly during this project, creating surface pools. The specially designed tractor got stuck.
5	Outboard Marine/Waukegan Harbor (OU #3), IL 1/92 to 7/92	Thermal Desorption Canonie Environmental Services Porter, IN	Soil/Sediments (16,000 cy)	PCBs Initial 20,000 - 10,000 ppm 99% removal	Continuous with a retention time of 15 minutes and throughput of 8-10 tons/hr. Temperature 1100°F Moisture content 20% or less Soda ash added to waste to meet DRE of 99.9999%	Excavation Mixing Dewatering	Cleaned soil and sediment stored in on- site containment cells. Waste water discharged to POTW.	Reduced PCB levels much more than expected.

TABLE 1-6
REMEDIAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

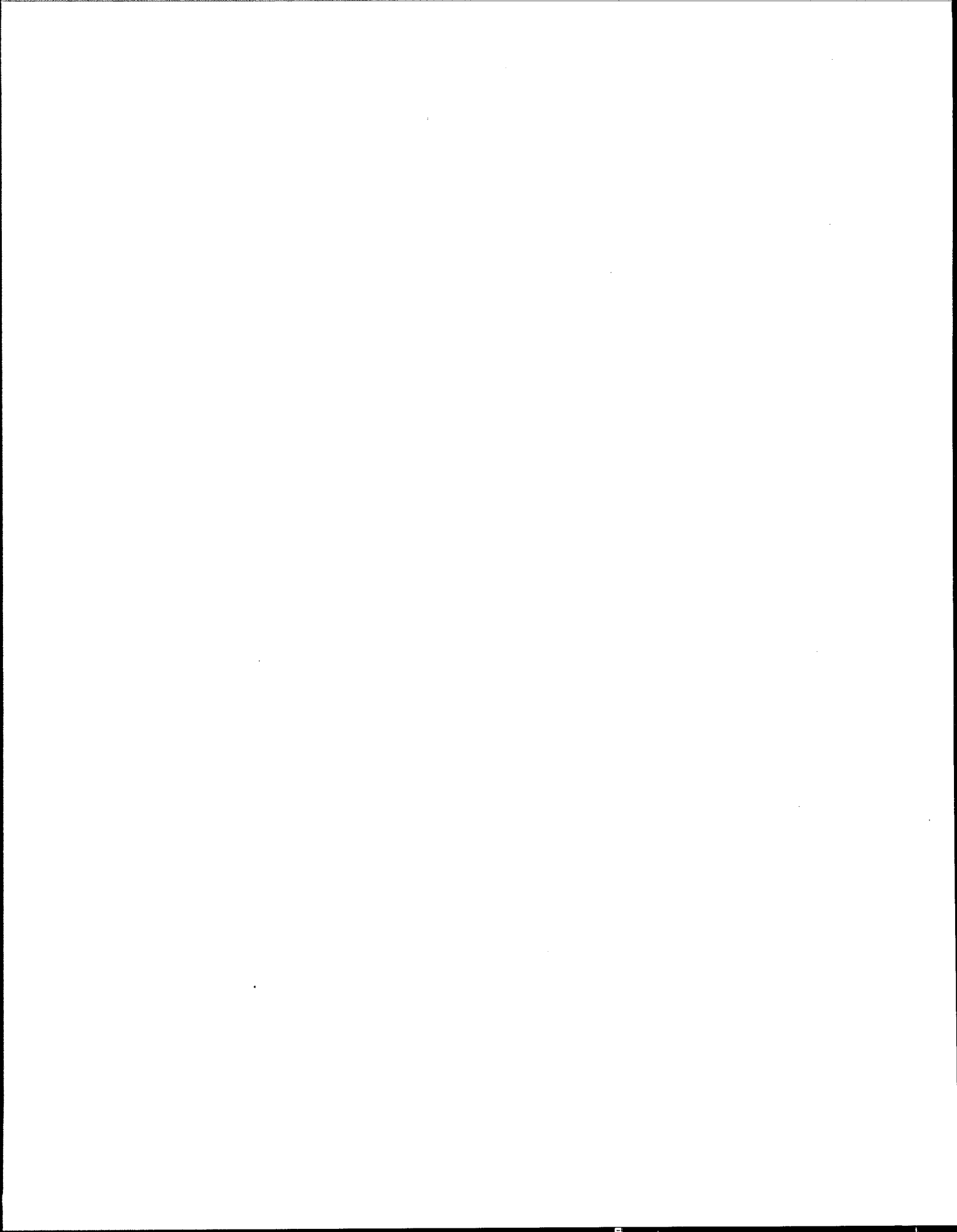
June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
5	Verona Well field (Thomas Solvent/Raymond Road), MI March 1988 to May 1992	Soil vapor extraction (attempted nitrogen sparging) Terra Vac, Inc. Costa Mesa, CA	Soil (35,000 cy, 1/2 acre to 18 ft. deep)	Initial soil concentration TCE 550,000 ppb; PCE 1.8 million ppb; Toluene 730,000 ppb; Xylene 500,000 ppb Criteria in all post remedial soil samples; Total Xylenes 6,000 ppb; Toluene 15,000 ppb; Benzene 20 ppb; Ethylbenzene 14,000 ppb; 1,1- DCE 10 ppb; trans-1,2-DCE 2,000 ppb; 1,1,1-TCA 4,000 ppb; Carbon tet., 10 ppb; 1,2- DCA 10 ppb; 1,1-DCA 20 ppb; Methylene chloride 100 ppb; cis-1,2 DCE 20 ppb; PCE 10 ppb; TCE 60 ppb	60 - 160 cu ft/min of air Started >4,400 lbs/day removed Shut off 5 lbs/day removed Total removed 65,000 lbs	No materials handling; required installing extraction wells	Spent carbon was regenerated (and eventually incinerated)	Initial estimate of 7,000 lbs of VOCs product too low. Treatment equipment undersized. Needed better quantification of VOCs in soils to design appropriate size. Plan for enhancing system to deal with saturated soils and free product. Public information available includes performance report, and technical memo.
8 #	Rocky Mountain Arsenal (OU 18) Interim Response, CO June 1991 to December 1991	Soil vapor extraction Vapor phase carbon adsorption to capture vapors Woodward Clyde Denver, CO	Soil (100 ft radius down to 60 ft; approximately 70,000 cy)	TCE Initial extracted gas concentration 60 ppm Final extracted gas concentration 2 to 3 ppm	250-300 cu. ft./min. of air Total removed 64 lbs.	No materials handling; required installing extraction wells	Vapors captured on carbon	Sampling indicated the presence of TCE mainly in the soil gas samples and not the soil samples
9	Fair Child Semiconductor San Jose, CA 1989 to June 1990	Soil vapor extraction with air flushing Carbon canister air stripping for pump and treat	Soil (10,000 cy)	Initial concentration TCA 670,000 ppb; 1,1-DCE 6,400 ppb freon 113 7,200 ppb Final concentrations unknown Target was 1 ppm	In situ	Excavation dewatering of soil where leaking UST was discovered		Will re-evaluate the remediation in 1994.

TABLE 1-6
REMEDIAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
9 #	Sacramento Army Depot Tank 2 Operable Unit, CA 11/91 to 4/93	In-situ soil vapor extraction, extracted vapor treated with gas phase carbon adsorption, entrained (suspended) water treatment by the existing on-site UV- hydrogen peroxide treatment plant/Terra Vac, Inc. Costa Mesa, CA	Soil (150 cy)	VOCs (Ethylbenzene, PCE, MEK Total Xylenes) Initial concentra- tion: MEK 0.011 - 15 mg/kg Ethylbenzene 0.006 - 2,100 mg/kg PCE 0.006 - 39 mg/kg Total Xylene 0.005 - 11,000 mg/kg Clean up goal 1.2 mg/kg MEK 6 mg/kg Ethylbenzene 23 mg/kg total Xylene 0.2 mg/kg PCE	24 hours/day	None	Extracted vapor treated with gas phase carbon adsorption entrained (suspended) water treatment by the existing on-site UV- hydrogen peroxide treatment plant	



Chapter 2

Superfund Removal Actions

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SUPERFUND REMOVAL ACTIONS

Superfund removal actions are conducted in response to an immediate threat caused by a release of hazardous substances. Removal action decisions are documented in an action memorandum. To date, innovative treatment technologies have been used in relatively few removal actions. The innovative technologies addressed in this report have been used 33 times in 28 removal actions (Figure 2-1). In addition, infrared incineration, no longer considered innovative, was first used at two removal actions.

Many removals involve small quantities of waste or immediate threats requiring quick action to alleviate the hazard. Often, such activities do not lend themselves to on-site treatment approaches. In addition, SARA does not prescribe the same preference for innovative treatment for removals that it does for remedial actions.

EPA would like to increase the use of innovative treatment methods to address removal problems. One of the seven initiatives set forth in the EPA directive described in the foreword concerns removal actions. It is

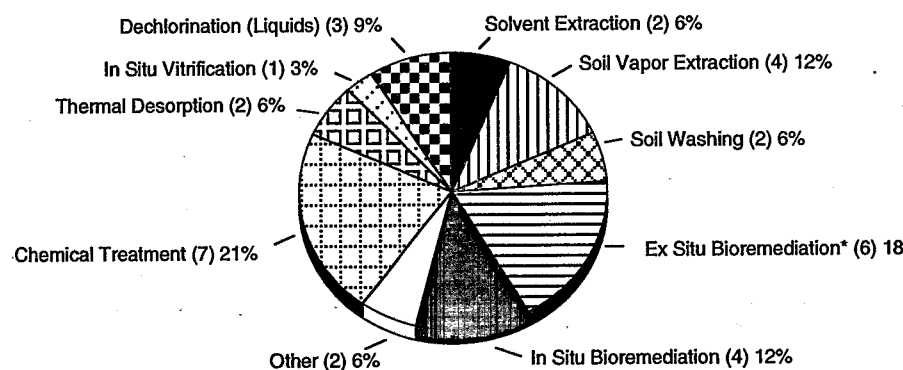
expected that innovative treatment technologies will be used more often in the future, for larger, and less time-critical removal actions.

Table 2-1 provides detailed information for each application of an innovative technology at a removal site. Tables 2-2 and 2-3 provide summaries by EPA Region and status for all applications of innovative technologies at removal sites. Table 2-4 lists removal sites using established treatment technologies.

Frequency of Technology Selection

Figure 2-1 lists each type of innovative treatment technology and indicates how often that technology has been selected as a remedy for removal actions. Figure 2-1 illustrates that chemical treatment was selected most often and represented 21 percent of all applications of innovative treatment technologies at removal sites. Bioremediation (ex situ) was chosen six times and represented 18 percent of all applications of innovative treatment technologies at removal sites.

FIGURE 2-1
SUPERFUND REMOVAL ACTIONS:
SUMMARY OF INNOVATIVE TECHNOLOGIES SELECTED/USED AS OF JUNE 1993
(Total = 33)



Note: Data from a survey of EPA Regional Removal Branch chiefs and On-Scene Coordinators.
* Includes one in situ groundwater treatment.

() Number of times this technology was selected or used.

Status of Innovative Technology Implementation

Figure 2-2 indicates the status of innovative treatment technologies that are being applied at removal action sites. Since removals are responses to an immediate threat and often involve smaller quantities of hazardous wastes than remedials, the implementation of the technology may progress faster at a removal site than at a remedial site. The figure indicates that a large percentage, 58 percent, of removal

projects involving innovative treatment technologies have been completed. Table 2-3 summarizes removal action sites using innovative treatment technologies by status and specific technology. Table 2-5 provides detailed information on removal projects that have been completed.

FIGURE 2-2
SUPERFUND REMOVAL ACTIONS:
PROJECT STATUS OF INNOVATIVE TREATMENT TECHNOLOGIES AS OF JUNE 1993*

Technology	Predesign/ In Design	Design Complete/Being Installed/ Operational	Project Completed	Total
Soil Vapor Extraction	0	1	3	4
Thermal Desorption	1	0	1	2
Ex Situ Bioremediation	1	3	2	6
In Situ Bioremediation [#]	0	2	2	4
Soil Washing	0	1	1	2
In Situ Flushing	0	0	0	0
Dechlorination	0	1	2	3
Solvent Extraction	0	0	2	2
In Situ Vitrification	0	1	0	1
Other Innovative Treatment	1	1	0	2
Chemical Treatment	0	1	6	7
TOTAL	3 (9%)	11 (33%)	19 (58%)	33

• Data derived from a survey of EPA Superfund Removal Branch Chiefs and On-Scene Coordinators for each Region.

Includes one in situ groundwater treatment.

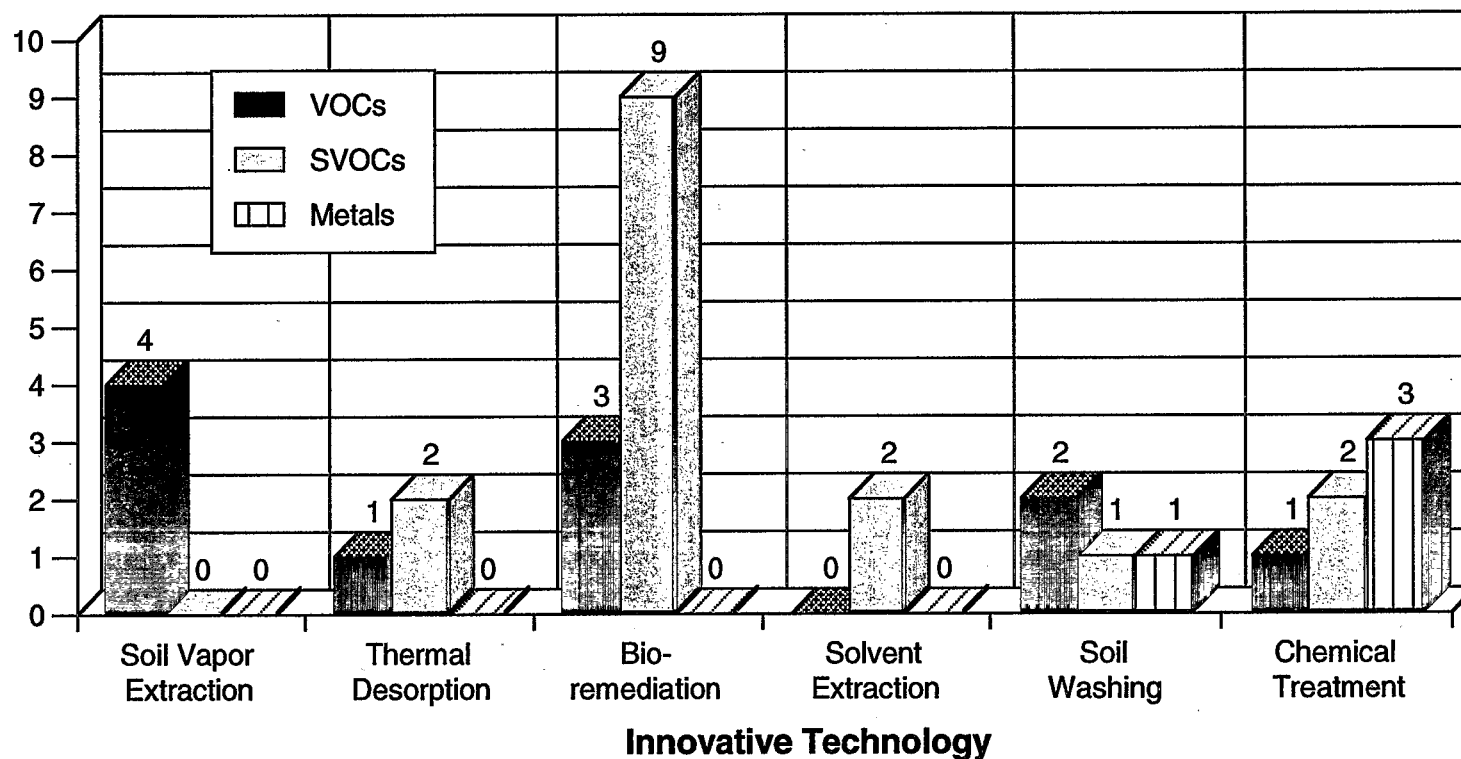
Contaminants Addressed by Innovative Treatment Technologies

Figure 2-3 provides information, by technology, for three major contaminant groups treated at removal action sites: volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and metals. For this report, compounds are categorized as VOCs or SVOCs, using the lists provided in EPA's SW-846 Test Methods 8240 and 8270, respectively.

Treatment Trains

Innovative treatment technologies in this report may be used together with established or other innovative treatment technologies in treatment trains. Technologies may be combined to reduce the volume of material requiring further treatment, to prevent the emission of volatile contaminants during excavation and mixing, or to address multiple contaminants in a single medium. Table 2-4 lists the sites at which such treatment trains are being used.

FIGURE 2-3
SUPERFUND REMOVAL ACTIONS: APPLICATION OF INNOVATIVE TREATMENT TECHNOLOGIES



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TABLE 2-1

REMOVAL ACTIONS: SITE-SPECIFIC INFORMATION BY INNOVATIVE TREATMENT TECHNOLOGY

Table 2-1 is the principal part of this chapter. It contains the most detailed, site-specific information for removal sites for which innovative treatment technology has been selected. The columns of Table 2-1 present the following information:

Region

This column indicates the EPA Region in which the site is located.

Site Name, State, Action Memo Date

This column identifies the site and the operable unit for which an innovative treatment technology was selected.

An action memorandum documents the selection of remedy in the removal program. The date shown in this column is the date on which an action memorandum was signed by an EPA official.

An asterisk (*) in this column indicates that a treatability study has been completed for this technology at the particular site.

Specific Technology

The second column describes the specific technology selected within a general category of innovative treatment. For example, within the general category of bioremediation, the specific technologies of land treatment or slurry-phase bioremediation may be chosen.

Site Description

This column provides information on the industrial source of the contamination at the site and allows analysis of the selection of innovative technologies by site type. For example, by using the information in this column, one may determine the most frequently selected innovative technology for wood preserving sites.

Media (quantity)

This column provides information on the media and quantity of material to be treated. If a treatment is used in situ, an effort has been made to include the maximum depth of the treatment to provide the reader with another parameter significant to the application.

TABLE 2-1 (Continued)

Key Contaminants Treated

The major contaminants or contaminant groups targeted by the treatment technology are shown in this column. There may be other contaminants as well that will be treated. Other contaminants that may be present, but that are not being addressed by the listed technology, are not included.

Status

This column indicates the status of the application of the innovative treatment technology. **Predesign** indicates that the ROD has been signed but design has not begun. During predesign, EPA may be negotiating with the potentially responsible parties, procuring the services of a design firm, or collecting information (such as conducting a treatability study) needed in the design stage. If a project is **in design**, the engineering documents needed to contract for and build the remedy are being prepared. If a remedy is **being installed**, the lead agency has signed a contract for the construction work needed to set up the remedy. The remedy is **operational** if it is completely installed and it is now being operated as a treatment system; the remedy is **completed** if the goals of the ROD or decision document for that treatment technology have been met and treatment has ceased.

One purpose of this column is to identify opportunities for vendors to become involved in the next phase of the projects. Whenever possible, the season and year that the current phase will end is given. This information is identified as the "completion planned" date.

Lead Agency, Treatment Contractor

The "lead" indicates whether federal dollars are to be used to implement the remedy (Fund lead) or the potentially responsible parties will conduct the remedy with EPA/State oversight (PRP lead). If a remedy is Fund lead, EPA may manage the design/construction through its contractors, the state may manage the project with Superfund dollars, or the U.S. Army Corps of Engineers (USACE) may act for EPA to manage the design or construction. Whichever agency or organization is responsible for managing the remedy, the contractor responsible for the actual installation and operation of the innovative technology also is identified, if the lead agency has selected a contractor.

Contacts/Phone

This final column provides the names and telephone numbers of useful contacts for the site or technology. The first name listed is usually the EPA on-scene coordinator (OSC) responsible for the site. If a remedy is being managed by the state, the name and phone number of the state RPM also is provided. Information on any other useful contacts is provided.

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Bioremediation (Ex situ)

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	GCL Tie and Treating, NY (3/26/91)	Composting	Wood preserving	Soil (4,800 cy)	PAHs (Creosote)	In design; Pilot study currently in progress	Federal lead/Fund Financed; ERT/REAC	Joe Cosentino 908-906-6983
4	Southeastern Wood Preserving, MS (09/30/90) See also Soil Washing	Slurry phase (preceded by soil washing)	Wood preserving	Soil (8,000 cy)	PAHs (Creosote)	Operational; Completion planned December 1993	Federal lead/Fund Financed; OHM Remediation Services Corp	Don Rigger 404-347-3931
5	Indiana Wood Treating, IN (10/11/92)	Composting	Wood preserving	Soil (18,000 cy)	PAHs (Creosote)	Operational; Completion planned Fall 1993; After 6 months 8 of 9 compost piles below treatment target levels.	PRP lead/Federal oversight; IT Corporation, CMC, Inc. - subcontractor	Steve Faryan 312-353-9351
6	MacMillan Ring Free Oil Company*, AR (11/09/92)	Solid phase	Petroleum refining and reuse	Sediments (38,000 cy)	VOCs (BTEX), PAHs (DAF Float)	Design completed but not installed; Completion planned Fall 1993; Waiting for contractor selection	Federal lead/Fund Financed	Charles Fisher 214-655-2224
7	Scott Lumber, MO (07/10/87)	Land treatment	Wood preserving	Soil (16,000 cy)	SVOCs (Phenols), PAHs (Benzo(a)pyrene)	Completed; Operational from 1987 to Fall 1991	Federal lead/Fund Financed; Remediation Technologies	Bruce Morrison 913-551-5014
9	Poly-Carb, NV (05/14/87) See also Soil Washing	Land treatment	Commercial waste management	Soil (1,500 cy)	SVOCs (Phenols), PAHs (Cresol)	Completed; Operational from 7/87 to 8/88	Federal lead/Fund Financed; Reidel Environmental Services	Bob Mandel 415-744-2290

Status as of June 1993. See Table 2-5 for performance and operational data on completed removal projects.
 * Indicates that a treatability study has been completed.
 Note: Contacts listed are EPA regional staff unless otherwise noted.

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Bioremediation (In situ)

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	CSX McCormick Emergency Response See also Soil Vapor Extraction	In situ ground water	Derailment (30,000 gallon spill)	Groundwater	VOCs (BETX)	Operational	PRP lead/Federal oversight; Kemron	Steve Spurlin 404-347-3931
6	Baldwin Waste Oil, TX (07/01/92)	In situ soil	Waste oil recycler	Soil (550 cy)	VOCs (BTEX), PAHs (TPH)	Operational; Completion planned Fall 1993	Federal lead/Fund Financed; Ecology & Environment, RSKERL (EPA), Reidel Environmental	Gary Guerra 214-665-6608
9	Gila River Indian Reservation, AZ (07/31/84) See also Chemical Treatment	In situ soil Preceded by chemical treatment	Drum storage/ disposal	Soil (3,200 cy)	Biocides (Toxaphene, Ethyl and Methyl Parathion)	Completed; Operational from 6/85 to 10/85	PRP lead/Federal oversight	Richard Martin 414-744-2288
9	Roseville Drums, CA (03/03/88)	In situ soil	Midnight Dump on Dirt Road	Soil (14 cy)	SVOCs (Dichlorobenzene, Phenols)	Completed; Fall 1988; Operational from 2/88 to 11/88	Federal lead/Fund Financed	Brad Shipley 415-744-2287

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Chemical Treatment

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Vineland Chemical, NJ (09/28/92)	Chemical Treatment	Pesticide manufacturing/use /storage	Solids (100 lb)	Metals (Mercury)	Completed; December 1992; Operation completed in one month	Federal lead/Fund Financed; Ensco	Don Graham 908-321-4345 Steve Brawley (Ensco) 706-278-1195
2	Zhiegner Refining Company, NJ	Chemical Treatment	Precious metal recovery	Solids (100 lb)	Metals (Mercury)	Completed; Summer 1993; Operational from 2/93 to 6/93	Federal lead/Fund Financed; Ensco	Dilshad Perera 908-321-4356 Steve Brawley (Ensco) 706-278-1195
3	Avtex Fibers, VA (11/14/89)	Chemical Treatment	Rayon manufacturing facility/wastewater r treatment	Sludge 39,000 gl)	Organics (Carbon disulfide)	Completed; August 1991	Federal lead/Fund Financed; OH Materials	Vincent Zenone 215-597-3038
5	PBM Enterprises (Van Dusen Airport Service), MI (04/10/88)	Oxidation using Sodium Hypochlorite	Silver Recovery Facility	Solids (quantity unknown)	Organic Cyanides	Completed; Operational from 5/85 to 10/85	Federal lead/Fund Financed; American Environmental Service, Inc.	Ross Powers 312-378-7661
8	Mouat Industries*, MT (09/20/91)	Reduction using sulfuric acid and ferrous sulfate	Metal ore mining and smelting	Soil (47,000 cy)	Metals (Chromium IV)	Operational; Completion planned Spring 1994; Operation started June 1993	PRP lead/Federal oversight; Baker Environmental	Tien Nguyen 303-297-7120
9	Gila River Indian Reservation, AZ (07/31/84) See also Bioremediation (In Situ)	Reduction using sodium hydroxide	Drum storage/ disposal	Soil (3,200 cy)	Biocides (Toxaphene, Ethyl and Methyl Parathion)	Completed; Operational from 4/85 to 10/85	Federal lead/Fund Financed	Richard Martin 414-744-2288

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Chemical Treatment (continued)

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
9	Stanford Pesticide #1, AZ (04/20/87)	Chemical treatment- alkaline hydrolysis	Pesticide manufacturing/use /storage, Farm Equipment Storage	Soil (200 cy)	Biocides (Methyl Parathion)	Completed; Operational from 7/87 to 9/87	Federal lead/Fund Financed; Crosby and Overton	Dan Shane 415-744-2286

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Dechlorination

Region	Site Name, State; (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Signo Trading/Mt. Vernon, NY (12/19/86)	Dechlorination	Waste Management Facility Warehouse	Sludge 15 gl)	Dioxins (2,3,7,8 TCDD-laden herbicides)	Completed; Operational during October, 1987	Federal lead/Fund Financed; Galson Research Corp (subcontractor to OHM)	Charles Fitzsimmons 201-321-6608
6	Fruitland Drum, NM (09/08/90)	Dechlorination	Operation/maintenance facility	Liquid (150 gl)	VOCs, Biocides, Dioxins (2,4,5-T), PAHs	Design completed but not installed; Completion planned Fall 1993; BCD was selected after APEG/KPEG was unsuccessful	Federal lead/Fund Financed; USEPA ERT/RREL	Craig Carlton 214-655-2220
7	Crown Plating, MO (08/29/89)	Dechlorination	Electroplating	Liquid (55 gl)	Biocides (silvex; 2,4,5 TP)	Completed; Operational from 10/ 89 to 12/89	Federal lead/Fund Financed	Mark Roberts 913-236-3881

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

In Situ Vitrification

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Parsons Chemical (ETH Enterprise), MI (09/21/90)	In situ Vitrification	Agricultural chemical facility	Soil (3,000 cy)	Biocides, Dioxins, Metals (Mercury)	Operational; Completion planned Fall 1993; First full-scale application of in situ vitrification at a hazardous waste site	Federal lead/Fund Financed; Geosafe Corp.	Len Zintak 312-886-4246

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Soil Vapor Extraction

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Basket Creek Surface Impoundment*, GA (04/11/91)	Soil vapor extraction ex situ, used on a soil pile	Surface impoundment used for disposal of solvents	Soil (2,000 cy)	VOCs (TCE, PCE, MEK, MIBK, Toluene, Xylene, Benzene)	Completed; Operational from 11/92 to 2/93	Federal lead/Fund Financed; OHM	Don Rigger 404-347-3931
4	CSX McCormick Derailment Site, SC See also Bioremediation (In Situ)	Soil vapor extraction with air flushing	Derailment (30,000 gallon spill)	Soil (200,000 cy)	VOCs (BETX)	Completed;	PRP lead/Federal oversight; Midwest Research Institute	Steve Spurlin 404-347-3931
4	Hinson Chemical, SC (11/28/88)	Soil vapor extraction with air flushing	Waste Reclaiming Facility	Soil (60,000 cy)	VOCs	Completed; March 1992; Operational December 1988 through March 1992	Federal lead/Fund Financed; OH Materials	Fred Stroud 404-347-3136
8	Mystery Bridge Road/Highway 20, OU 2*, WY Emergency Response See also Other Technologies	Soil vapor extraction	Natural gas compressor station	Soil (160,000 cy)	VOCs (Benzene)	Operational	PRP lead/Federal oversight; Adrian Brown Consultants	Bert Garcia 303-293-1526

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Soil Washing

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Southeastern Wood Preserving, MS 09/30/90) See also Bioremediation (Ex Situ)	Soil washing (sand removal, followed by bioremediation of fines	Wood preserving	Sludge quantity (unknown), Solids (8,000 cy)	SVOCs, PAHs (Creosote)	Operational; Completion planned Winter 1993	Federal lead/Fund Financed; OHM Remediation Services Corp.	Don Rigger 404-347-3931
9	Poly-Carb, NV (05/14/87) See also Bioremediation (Ex Situ)	Soil washing	Commercial waste management	Soil (1,500 cy)	SVOCs (Phenols), PAHs (Cresol)	Completed; Operational 7/87 to 8/88	Federal lead/Fund Financed; Reidel Environmental Services	Bob Mandel 415-744-2290

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Solvent Extraction

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	General Refining*, GA (08/13/85)	Solvent extraction	Waste oil recycling facility	Sludge 2,700 cy), Solids (700 cy), Soil (6,600 gl)	PCBs	Completed; Operational from 8/86 to 2/87	Federal lead/Fund Financed; Resource Conservation Co.	Shane Hitchcock 404-347-3136
6	Traband Warehouse, OK (01/01/88)	Solvent Extraction	Storage Management Complex	Solids (quantity unknown)	PCBs	Completed; Project ended in February, 1989	Federal lead/Fund Financed; Terra-Clean	Pat Hammack 214-655-2270

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Thermal Desorption

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	FCX-Washington Site, NC (12/04/91)	Thermal Desorption	Pesticide manufacturing/use /storage	Soil (5,000 cy)	Biocides (Chlordane, Methoxychlor, DDT, DDE)	Predesign; Original action memo specified incineration; revised action memo will be completed in Fall 1993	Federal lead/Fund Financed	Paul Peronard 404-347-3931
10	Drexler - RAMCOR*, WA (09/30/91)	Thermal Desorption	Waste oil recycler	Soil (3,000 cy)	VOCs (BTEX), PAHs (Petroleum hydrocarbons)	Completed; Operational from 7/92 to 8/92	Federal lead/Fund Financed; Four Seasons	Chris Field 206-553-1674

Table 2-1
Removal Actions: Site-Specific Information By Innovative Treatment Technology

June 1993

Other

Region	Site Name, State, (Action Memo Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
2	Imperial Oil Company, NJ (09/29/92)	Viscous fluid extraction	Former Waste Oil Recycler	Soil (quantity unknown), Groundwater	VOCs, PCBs, PAHs	Being installed; Installation completion planned Fall 1993; Operational by Fall 1993	Federal lead/Fund Financed; Enivronmental Technology of North America	Louis DiGuardia 908-906-6927
8	Mystery Bridge Road/Highway 20, OU 2*, WY See also Soil Vapor Extraction	Air Sparging	Natural gas compressor station	Groundwater	VOCs (Benzene)	In design; Design completion planned Summer 1993; Pilot-scale is currently operating	PRP lead/Federal oversight; Adrian Brown Consultants	Bert Garcia 303-293-1526

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TABLE 2-2

REMOVAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES BY EPA REGION

Table 2-2 summarizes the innovative treatment technologies used at sites where removal actions were conducted in each EPA region.

TABLE 2-2. REMOVAL ACTIONS: INNOVATIVE TREATMENT TECHNOLOGIES
BY EPA REGION

June 1993

TECHNOLOGY	SITE NAME	STATE	TECHNOLOGY	SITE NAME	STATE
<u>REGION 2</u>			<u>REGION 6</u>		
Chemical Treatment	Vineland Chemical	NJ	Bioremediation (Ex situ)	MacMillan Ring Free Oil Company	AR
Chemical Treatment	Zhiegner Refining Company	NJ	Dechlorination	Fruitland Drum	NM
Viscous fluid extraction	Imperial Oil Company	NJ	Solvent Extraction	Traband Warehouse	OK
Bioremediation (Ex situ)	GCL Tie and Treating	NY	Bioremediation (In situ)	Baldwin Waste Oil	TX
Dechlorination	Signo Trading/Mt. Vernon	NY			
<u>REGION 3</u>			<u>REGION 7</u>		
Chemical Treatment	Avtex Fibers	VA	Bioremediation (Ex situ)	Scott Lumber	MO
			Dechlorination	Crown Plating	MO
<u>REGION 4</u>			<u>REGION 8</u>		
Solvent Extraction	General Refining	GA	Chemical Treatment	Mouat Industries	MT
Soil Vapor Extraction	Basket Creek Surface Impoundme	GA	Soil Vapor Extraction	Mystery Bridge Road/Highway 20	WY
Bioremediation (Ex situ)	Southeastern Wood Preserving	MS	Air Sparging	Mystery Bridge Road/Highway 20	WY
Soil Washing	Southeastern Wood Preserving	MS			
Thermal Desorption	FCX-Washington Site	NC	<u>REGION 9</u>		
Bioremediation (In situ)	CSX McCormick Derailment Site	SC	Bioremediation (In situ)	Gila River Indian Reservation	AZ
Soil Vapor Extraction	CSX McCormick Derailment Site	SC	Chemical Treatment	Gila River Indian Reservation	AZ
Soil Vapor Extraction	Hinson Chemical	SC	Chemical Treatment	Stanford Pesticide #1	AZ
<u>REGION 5</u>			Bioremediation (In situ)	Roseville Drums	CA
Bioremediation (Ex situ)	Indiana Wood Treating	IN	Bioremediation (Ex situ)	Poly-Carb	NV
Chemical Treatment	PBM Enterprises (Van Dusen Airport)	MI	Soil Washing	Poly-Carb	NV
In situ Vitrification	Parsons Chemical (ETM Enterprises)	MI	<u>REGION 10</u>		
			Thermal Desorption	Drexler - RAMCOR	WA

TABLE 2-3

REMOVAL ACTIONS: PROJECT STATUS BY INNOVATIVE TREATMENT TECHNOLOGY

Table 2-3 lists the applications of innovative treatment technologies at removal sites by technology and summarizes the status of the specific application. The symbols used in this table are:

- PD - **In predesign:** A site may be considered to be in predesign if EPA is negotiating the consent decree for the design with the responsible party, the lead agency is preparing the predesign report, the lead agency is contracting for the design firm, or the lead agency is conducting a treatability study or field investigation before beginning actual design work.
- D - **In design:** A site is considered to be in design after the design contractor has begun work.
- D/I - **Design completed but not installed:** This symbol is used if the **design** work has been completed but **installation** work had not yet begun at the time of publication of this report.
- I - **Being installed:** An innovative treatment technology is "being installed" from the time the construction contract has been awarded until the time the treatment system has begun operation. For some technologies, this is a relatively short phase of the project, because such projects are quickly assembled on site. For other technologies, the period of installation lasts several construction seasons.
- O - **Operational:** A treatment technology is operational once it has been constructed and has been proven to be functional. The length of time required to complete the operation phase depends on such factors as the nature of the technology, the quantity of material to be treated, and the concentrations of the contaminants at the start of treatment.
- C - **Completed:** A treatment technology project is considered to be completed when the operation of the treatment technology ceases. Other site activities still may be planned or ongoing.

TABLE 2-3. REMOVAL ACTIONS: PROJECT STATUS
BY INNOVATIVE TREATMENT TECHNOLOGY

June 1993

<u>REGION</u>	<u>BIOREMEDIATION (EX SITU)</u>	<u>STATUS</u>
2	GCL Tie and Treating, NY	D
6	MacMillan Ring Free Oil Company, AR	D/I
4	Southeastern Wood Preserving, MS	O
5	Indiana Wood Treating, IN	O
7	Scott Lumber, MO	C
9	Poly-Carb, NV	C

<u>REGION</u>	<u>BIOREMEDIATION (IN SITU)</u>	<u>STATUS</u>
4	CSX McCormick Derailment Site, SC	O
6	Baldwin Waste Oil, TX	O
9	Gila River Indian Reservation, AZ	C
9	Roseville Drums, CA	C

<u>REGION</u>	<u>CHEMICAL TREATMENT</u>	<u>STATUS</u>
8	Mouat Industries, MT	O
2	Vineland Chemical, NJ	C
2	Zhiegner Refining Company, NJ	C
3	Avtex Fibers, VA	C
5	PBM Enterprises (Van Dusen Airport Service), MI	C
9	Gila River Indian Reservation, AZ	C
9	Stanford Pesticide #1, AZ	C

<u>REGION</u>	<u>DECHLORINATION</u>	<u>STATUS</u>
6	Fruitland Drum, NM	D/I
2	Signo Trading/Mt. Vernon, NY	C
7	Crown Plating, MO	C

<u>REGION</u>	<u>IN SITU VITRIFICATION</u>	<u>STATUS</u>
5	Parsons Chemical (ETM Enterprise), MI	O

<u>REGION</u>	<u>SOIL VAPOR EXTRACTION</u>	<u>STATUS</u>
8	Mystery Bridge Road/Highway 20, OU 2, WY	O
4	Basket Creek Surface Impoundment, GA	C
4	CSX McCormick Derailment Site, SC	C
4	Hinson Chemical, SC	C

<u>REGION</u>	<u>SOIL WASHING</u>	<u>STATUS</u>
4	Southeastern Wood Preserving, MS	O
9	Poly-Carb, NV	C

<u>REGION</u>	<u>SOLVENT EXTRACTION</u>	<u>STATUS</u>
4	General Refining, GA	C
6	Traband Warehouse, OK	C

<u>REGION</u>	<u>THERMAL DESORPTION</u>	<u>STATUS</u>
4	FCX-Washington Site, NC	PD
10	Drexler - RAMCOR, WA	C

<u>REGION</u>	<u>OTHER</u>	<u>STATUS</u>
8	Mystery Bridge Road/Highway 20, OU 2, WY	D
2	Imperial Oil Company, NJ	I

TABLE 2-4

REMOVAL ACTIONS: TREATMENT TRAINS WITH INNOVATIVE TREATMENT TECHNOLOGIES

Table 2-4 lists the at which innovative treatment technologies are used together with established or other innovative treatment technologies in treatment "trains." Technologies may be combined to reduce the volume of material requiring further treatment, to prevent the emission of volatile contaminants during excavation and mixing, or to address multiple contaminants in a single medium.

TABLE 2-4. REMOVAL ACTIONS: TREATMENT TRAINS WITH INNOVATIVE TECHNOLOGIES

June 1993

Chemical Treatment Followed by

In Situ Bioremediation	Gila River Indian Reservation	AZ
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In Situ Flushing Followed by

In Situ Bioremediation	Polycarb	NV
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Soil Washing Followed by

Bioremediation	Southeastern Wood Preserving	MS
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Solvent Extraction Followed by

Solidification/Stabilization	General Refining	GA
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TABLE 2-5

REMOVAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS

Table 2-5 provides summary information on the performance and operating parameters for applications of innovative treatment technologies that have been completed at removal sites. It is intended to supplement, not replace, the information included in tables 2-1, 2-2, and 2-3.

TABLE 2-5
REMOVAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
2	Signo Trading International, Inc., NY 10/20/87 to 10/21/87 (Removal)	KPEG dechlorination/ Galson Remediation, Syracuse, NY	Sludge (15 gallons)	Dioxin Input - 135 ppb Output - 1 ppb	Temperature: 150°C Time: Overnight	None	Incineration of residuals (without dioxin contamination) at treatment, storage, and disposal facility	
2 #	Vineland Chemical Company, NJ 12/92 (Removal)	Mercury pretreatment precipitated mercury salts into mercury sulfide so that the mercury can be recovered and recycled. ENSCO	Solid 100 lbs	Mercury initial concentration >10% mercury Final concentration of mercury in recyclable precipitate was greater than 80%. Less than 260 ppm if mercury in thatn nonrecycled salt.	Added salt to precipitate the mercury	None	Residual salts containing less than 260 pm mercury were incinerated off-site	First known Superfund site where this process has been applied
2 #	Zhiegner Refining Company (Removal) 2/93 - 6/93	Mercury pretreatment precipitated mercury salts into mercury sulfide so that the mercury can be recovered and recycled. ENSCO	Solid 100 lbs	Mercury initial concentration >10% mercury Final concentration of mercury in recyclable precipitate was greater than 80%. Less than 260 ppm if mercury in thatn nonrecycled salt.	Added salt to precipitate the mercury	None	Residual salts containing less than 260 pm mercury were incinerated off-site	No comments

TABLE 2-5
REMOVAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
3	Avtex Fibers, VA 4/90 to 8/91 (Removal)	Chemical treatment (oxidation using NaClO) OH Materials, Findlay, OH (ERCS Contractor)	Sludge/water from storage unit (2 million gallons)	Carbon disulfide Criteria: ≤ 10 ppm - Carbon disulfide in the effluent Input: 50-200,000 ppm Carbon disulfide Output: ≤ 10 ppm Carbon disulfide	Batch operation average retention time - 1 hour pH - 10 Additives: Sodium hypochloride. The retention time and reagent feed rates increased with increasing concentration of sludge in the contaminated water.	Pumping	Salts from the reaction were removed with flocculation and clarifi- cation at existing treatment plant, pH adjustment	Carbon disulfide is unstable and will be found with other contaminants in aqueous waste stream. For additional information on this project, see the Removal Close Out Report available from EPA - Region III or OH Materials.
4	General Refining Company, GA August-October, 1986 January-February, 1987 (Removal)	Solvent extraction Resource Conservation Technology Company, Bellevue, WA	Sludge (3,448 tons)	Input: PCB - 5.0 ppm Lead - 10,000 ppm Output: PCB - insignificant Lead - concentrated in solids	Continuous operation Time: 2 hours pH: 10 Temp: 20°C Rate: 27 tons/day Moisture content - 60% Additives: Sodium hydroxide Triethylamine	Excavation Screening Neutralization Size Reduction Mixing	Oil - used as fuel for kiln Water - treated, discharged off site Solids - solidified and disposed of on site	The oil recovered from the extractions process could not be sold because of an elevated metals content. The solvent could not be recovered due to leaks in system seals. The unit required a relatively uniform material so materials handling of the sludges proved difficult in the beginning of the project. The lead- bearing solids produced by the dryer also required special handling. Finally, detergents in the sludge hindered oil/water separation.

TABLE 2-5
REMOVAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
4	Hinson Chemical, SC 12/88 to 3/92 (Removal)	Soil vapor extraction OH Materials Atlanta, GA	Soil (60,000 cy, up to 50 ft deep)	Benzene, TCE, PCE, DCA, MEK At completion: <10 ppm Total VOCs (In all samples); average <1 ppm Total VOCs	In situ; continuous operation (except for occasional shut downs to allow soil gas to reach equilibrium in the pore spaces)		Air emissions captured on vapor phase carbon No cap needed	
4 #	CSX McCormick Derailment Site, S.C. (Removal)	Soil vapor extraction with air flushing MWRI	Soil (200,000 cy)	Benzene-toluene- ethylbenzene-xylene (BTEX) 130,000 gallon spill	Used a system of extraction and injection wells. 1,000 separate PVC wells. Injection wells 7 to 8 feet deep. Extraction wells 2-3 feet deep. Vapors captured and put through a knock out pot and incinerated.	Brought in clay to cover the area, to prevent air from infiltrating	Residual wastewater sent off-site for treatment	System was successful in decreasing concen- tration to cleanup goals. Had difficulties due to fluctuation of shallow ground water. Did not anticipate the change in ground water to be as drastic as it was. It decreased the efficiency, less vapors and more water. Now need to address ground water. Could have used the soil vapor extraction in a more limited area.

**TABLE 2-5
REMOVAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)**

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
4 #	Basket Creek Surface Impoundment, GA 11/92 - 2/93 (Removal)	Vacuum extraction of soil pile with horizontal wells (ex-situ) OHM	Soil (2,000 cy)	VOCs TCE, PCE, MEK, MIBK, BTEX High 33% VOCs Average 1-5% Criteria: TCE - 0.5 mg/L TCLP PCE - 0.7 mg/L TCLP All VOCs met TCLP limits	Vacuum pressure monitored. 1,300 CFM/Manifold 3 manifold 6-7 wells/manifold	Surface impoundment used for disposal of waste solvents. Built an enclosure over the site. Excavated the soil and screened it with a power screen. Stacked on PVC extraction wells. Recovered VOCs with duct work and fan. Vapors incinerated.	Residual soils and rejects from screening met TCLP limits and were disposed as nonhazardous as on RCRA Subtitle D landfill. Incinerated 70,000 lbs of VOCs	\$2,000,000 total costs. Permeability in-situ soil was not good at first. Excavation and ex-situ treatment improved permeability. Shouldn't rule out if you can't do in situ.
5	PBM Enterprises, MI 3/25/85 to 10/28/85 (Removal)	Neutralization with hypochlorite process Mid-American Environmental Service, Riverdale, IL	Film chips (464 tons or 1,280 cy)	Cyanide Input: 200 ppm Output: 20 ppm	Time: 2-3 hours Additives: sodium hydroxide	Agitation	Rinse water, runoff and waste hypochlorite - treated off site Treated chips - landfilled (Subtitle D)	
6	Traband Warehouse PCBs, OK (Removal) 2/90 to 9/90	Solvent Extraction/ Terra Kleen	Solids	PCBs Initial: 7,500 ppm				

TABLE 2-5
REMOVAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
7	Crown Plating, MO 10/1/89 to 12/31/89 (Removal)	Dechlorination using the KPEG process EPA removal contractor	Liquid (5 gallons)	Criteria: Dioxin - <1 ppb Input: Silvex - 10,000 ppm Dioxin equivalents - 24.18 ppb Output: Silvex - 32 ppb Dioxin equivalents - 0.068 ppb	Batch operation Retention time - 36 hours (including time of equipment breakdown) Temperature - 72°C pH - 13 Moisture content - 100%		Built an on-site vacuum for emissions control Contaminated residual oil incinerated off-site	
7	Scott Lumber, MO 8/87 - Fall, 91 (Removal)	Land Treatment RETEC Chapel Hill, NC	Soil (16,000 cy)	Criteria: 500 ppm - Total PAH 14 ppm - Benzo(a)pyrene Output: 160 ppm Total PAH 12 ppm Benzo(a)pyrene	Additives: Water phosphates	Tilling	None	

TABLE 2-5
REMOVAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
9	Gila River Indian Reservation, AZ 3/28/85 to 6/24/85 (Removal)	In situ chemical treatment (followed by anaerobic bio-remediation) EPA removal contractor	Soil (3,220 cy)	Input: Toxaphene - 1,470 ppm Ethyl parathion - 86 ppm Methyl parathion - 24 ppm Output: Toxaphene - 470 ppm Ethyl parathion - 56 ppm Methyl parathion - 3 ppm	pH: 10.2 to 11.8 Moisture: wet Additives to soil: Sodium hydroxide, Water		Bioremediation	
9	Gila River Indian Reservation, AZ 6/24/85 to 10/23/85 (Removal)	In situ anaerobic biological treatment (preceded by chemical treatment) EPA removal contractor	Soil (3,220 cy)	Toxaphene Input: 470 ppm Output: 180 ppm	pH: 8.3 to 9.8 Additives to soil: Sulfuric acid, manure, sludge	Tilling	Capped in place	The biological treatment would have been more successful if the neutralization after the chemical treatment had been more complete. The tearing of the plastic sheets covering the soils allowed air in and prevented anaerobic activity.
9	Roseville Drums, CA 2/12/88 to 11/9/88 (Removal)	In situ Bioremediation EPA removal contractor	Soil (14 cy)	Input: Dichlorobenzene - 4,000 ppm Phenol - 12,000 ppm Output: Dichlorobenzene - 140 ppm Phenol - 6 ppm	Additives to soil: manure, water	Tilling		

TABLE 2-5
REMOVAL ACTIONS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
9	Stanford Pesticide Site #1, AZ 3/20/87 to 11/4/87 (Removal)	Chemical treatment - alkaline hydrolysis EPA removal contractor	Soil (200 cy)	Methyl parathion Input: 24.2 ppm Output: 0.05 ppm	pH: 9.0 Moisture: wet Additives to soil: soda ash, water, activated carbon	Tilling (in situ, 3 times per week)		
9	Poly-Carb, Inc., NV 7/22/87 to 8/16/88 (Removal)	Land treatment and soil washing EPA removal contractor	Soil (1,500 cy)	Input: Phenol 1,020 ppm o-cresol - 100 ppm m- and p-cresol - 409 ppm Output: Phenol - 1 ppm o-cresol - 1 ppm m- and p-Cresol - 0.92 ppm	Additives: water	Excavation Placement in double-lined pit Irrigation Tilling	Leachate collection and treatment with granular activated carbon	This treatment used both bioremediation and soil flushing in one step.
10 #	Drexler-RAMCOR, WA 7/92 to 8/92 (removal)	Low temperature thermal desorption treatment. Thermally treat 3,000 tons of soil on-site up to 700°F. Four Seasons	Soil 3,000 tons (approximately 3,000 cy)	Petroleum hydrocarbons Polynuclear Aromatics, BTEX (Benzene, Toluene, Ethylbenzene, Xylene 200 ppm TPH was target. Initial TPH was 70,000 ppm - (high) 15,000 - 20,000 ppm (average).	16 hours/day 12 to 15 tons/hr Operating temperature up to 700°F	Excavation screening Removed material greater than 2 inches. Rock washing station for particles greater than 2 inches. Steam cleaned large rocks.	Treated soil was backfilled back into the excavated areas on-site. Soil that did not meet the targets was re-treated. Wastewater was treated on-site through carbon filters.	Total cost approximately \$250,000.

Chapter 3

Actions Under Other Federal Programs

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ACTIONS UNDER OTHER FEDERAL PROGRAMS

This chapter contains available information on projects conducted under other federal programs that are not part of the Superfund program (non-Superfund sites). Many of these projects take place at DoD and DOE facilities. Many of the DoD projects are funded by the Defense Environmental Restoration Program (DERP), which includes the installation restoration program (IRP) and the formerly used defense sites (FUDS) program in DoD. These sites were identified through various sources of information, including discussions with DoD and DOE personnel. However, this list of sites should not be considered comprehensive.

This chapter contains information on the application of innovative technologies at 28 non-Superfund sites. Figure 3-1 lists each type of innovative treatment technology and the number of times it has been selected as a remedy at a non-Superfund site. Figure 3-2 indicates the status of innovative technologies being applied at non-Superfund sites. Table 3-1 provides detailed information on each application. Tables 3-2 and 3-3 present summaries of each application by status and EPA Region. Table 3-4 lists details on completed applications.

FIGURE 3-1
SAMPLE OF PROJECTS UNDER OTHER FEDERAL PROGRAMS:
STATUS OF INNOVATIVE TREATMENT TECHNOLOGIES AS OF JUNE 1993*

Technology	Predesign/ In Design	Design Complete/Being Installed/ Operational	Project Completed	Total
Soil Vapor Extraction	4	4	1	9
Thermal Desorption	0	0	0	0
Ex Situ Bioremediation	1	1	3	5
In Situ Bioremediation*	2	5	2	9
Soil Washing	1	0	1	2
In Situ Flushing	0	0	0	0
Dechlorination	0	1	0	1
Solvent Extraction	0	0	0	0
In Situ Vitrification	0	0	0	0
Other Innovative Treatment	1	1	0	2
Chemical Treatment	0	0	0	0
TOTAL	9 (32%)	12 (33%)	7 (58%)	28

* Data derived from a survey of EPA Superfund Removal Branch Chiefs and On-Scene Coordinators for each Region.

* Also includes in situ groundwater treatment.

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TABLE 3-1

OTHER FEDERAL PROGRAMS: SITE-SPECIFIC INFORMATION BY INNOVATIVE TREATMENT TECHNOLOGY

Table 3-1 is the principal part of this chapter. It contains the most detailed, site-specific information for removal sites for which an innovative treatment technology has been selected. The columns of Table 3-1 present the following information:

Region

This column indicates the EPA Region in which the site is located.

Site Name, State

This column identifies the site and the operable unit for which an innovative treatment technology was selected.

An asterisk (*) in this column indicates that a treatability study has been completed for this technology at the particular site.

Specific Technology

The second column describes the specific technology selected within a general category of innovative treatment. For example, within the general category of bioremediation, the specific technologies of land treatment or slurry-phase bioremediation may be chosen.

Site Description

This column provides information on the industrial source of the contamination at the site and allows analysis of the selection of innovative technologies by site type. For example, by using the information in this column, one may determine the most frequently selected innovative technology for wood preserving sites.

Media (quantity)

This column provides information on the media and quantity of material to be treated. If a treatment is used in situ, an effort has been made to include the maximum depth of the treatment to provide the reader with another important parameter regarding the application.

TABLE 3-1 (Continued)

Key Contaminants Treated

The major contaminants or contaminant groups targeted by the treatment technology are shown in this column. There may be other contaminants as well that will be treated. Other contaminants that may be present, but that are not being addressed by the listed technology, are not included.

Status

This column gives the status of the application of the innovative treatment technology. **Predesign** indicates that the ROD has been signed but design has not begun. During predesign, EPA may be negotiating with the potentially responsible parties, procuring the services of a design firm, or collecting information (such as conducting a treatability study) needed in the design stage. If a project is in **design**, the engineering documents needed to contract for and build the remedy are being prepared. If a remedy is **being installed**, the lead agency has signed a contract for the construction work needed to set up the remedy. The remedy is **operational** if it is complete and it is now being operated as a treatment system; the remedy is **completed** if the goals of the ROD or decision document for that treatment technology have been met and treatment has ceased.

One purpose of this column is to identify opportunities for vendors to become involved in the next phase of the projects. Whenever possible, the season and year that the current phase will end is given. This information is identified as the "completion planned" date.

Lead Agency, Treatment Contractor

The "lead" indicates whether federal dollars are to be used to implement the remedy (Fund lead) or the potentially responsible parties will conduct the remedy with EPA/State oversight (PRP lead). If a remedy is Fund lead, EPA may manage the design/construction through its contractors, the state may manage the project with Superfund dollars, or the U.S. Army Corps of Engineers (USACE) may act for EPA to manage the design or construction. Whichever agency or organization is responsible for managing the remedy, the contractor responsible for the actual installation and operation of the innovative technology also is identified, if the lead agency has selected a contractor.

Contacts/Phone

This final column gives the names and telephone numbers of useful contacts for the site or technology. The first name listed is usually the project manager or point of contact responsible for the site. If a remedy is being managed by the state, the name and phone number of the state project manager also is provided. Information on any other useful contacts is provided.

Table 3-1
Other Federal Programs: Site-Specific Information By Innovative Treatment Technology

June 1993

Bioremediation (Ex situ)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
6	Matagorda Island AF Range, TX	Solid phase	Federal Facility	Soil (500)	VOCs (BTEX), PAHs (TPH, Tar)	Completed; Operational from 10/92 to 3/93	Army (USACE)/DoD Financed - IRP Program; CCC, Inc.	Vic Heister 918-669-7222
8	Former Glasgow AFB, MT	Land treatment	UST removal site	Soil (2,000 cy)	VOCs, PAHs (Petroleum hydrocarbons)	In design; Design completion planned Fall 1993; Contractor will be selected in Fall 1993	ARMY (USACE)/DoD Financed FUDS Program	Martin Rasmussen (USACE, Omaha) 402-221-3827 Steve Ott (USACE, Omaha) 402-221-7670
9	Ft. Ord Marina, Fritzche AAF Fire Drill Area, CA	Land treatment	Fire Drill Area	Soil (4,000 cy)	VOCs (TCE, MEK), PAHs (Petroleum hydrocarbons)	Completed; Winter 1991	Army (USACE)/DoD Financed - IRP Program	Gail Youngblood 408-242-8017
9	Marine Corps., Mountain Warfare Center, Bridgeport, CA	Bioremediation (Ex Situ) Heap pile bioreactor with aeration and irrigation	Federal Facility	Soil (7,000 cy)	PAHs (Petroleum hydrocarbons, Diesel)	Completed; 1989; Pilot-scale project	State Lead/Western Division of NFEC; ENSR	Bill Major 805-982-1808
10	Ft. Wainwright*, AK	Land treatment	Federal Facility, fuel pipeline, aboveground storage tank	Soil (4,500 cy)	PAHs (Diesel)	Being installed; Installation completion planned Fall 1993	Army (USACE)/DoD Financed - IRP Program; Laidlaw	Diane Soderland 907-753-3425 David Williams (USACE) 907-753-5657

Status as of June 1993. See Table 3-4 for performance data on completed projects under other Federal programs.

* Indicates that a treatability study has been completed.

Note: Contacts listed are EPA regional staff unless otherwise noted.

Table 3-1
Other Federal Programs: Site-Specific Information By Innovative Treatment Technology

June 1993

Bioremediation (In situ)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Savannah River DOE, M Area Settling Basin, SC See also Soil Vapor Extraction, Other Technologies	In situ ground water	Leaking solvent line	Groundwater	VOCs (TCE, PCE), PAHs (DNAPLs)	Operational; Operation began in 1990	DOE Lead/DOE funding; Westinghouse Savannah River Company	Nate Ellis (DOE) (803)-952-4846 Brian Loony (WSRC) (803)-752-5181
6	Holloman AFB, Main POL Area, NM See also Soil Vapor Extraction, Other Technologies	In situ ground water injecting air and nutrients	Former above ground fuel storage tank area (JP-4 and AV Gas spill)	Groundwater	VOCs (Benzene), PAHs (Petroleum Hydrocarbons)	In design; Design completion planned Fall 1993; Construction scheduled to start Fall 1993	USACE/Air Force IRP Program	Ron Stirling (USACE) 402-221-7664
6	Kelly AFB, Site 1100*, TX See also Soil Vapor Extraction	In situ soil Bioventing	Federal Facility (hazardous waste facility)	Soil (37,000 cy)	VOCs (JP-4)	Operational; Completion planned 1994	Army (USACE)/Air Force Funded; IT Corporation	Joe Laird (USACE, Omaha) 402-221-7772
8	Ft. Carson*, CO	In situ soil Bioventing	UST Remediation	Soil (quantity unknown)	VOCs (JP-4)	Being installed; Installation completion planned Summer 1993	Army (USACE)/DoD Financed - IRP; Woodward Clyde	Mike Steffensmeier (USACE) 402-342-7163
9	Aua Fuel Farm, Aua Village, American Samoa,	Bioremediation (In Situ)	Fuel Farm	Soil (quantity unknown)	PAHs (Diesel fuel)	Operational	Army (USACE)/DoD Financed - FUDS Program	Helene Takemoto (USACE, pac div) 808-438-6931
9	Davis Monthan AFB, AZ	In situ soil	Federal Facility	Soil (440 cy)	PAHs (Petroleum hydrocarbons)	Completed; Operational from 7/91 to 3/92	USACE/Air Force	Mike Steffansmeyer (USACE, Omaha) 402-221-7163

Table 3-1
Other Federal Programs: Site-Specific Information By Innovative Treatment Technology

June 1993

Bioremediation (In situ) (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
9	Davis Monthan AFB, Site 35, AZ See also Soil Vapor Extraction	In situ soil Bioventing	JP-4 Pump House	Soil (63,000 cy)	VOCs (JP-4), PAHs	In design; Design completion planned Fall 1993	USACE/ Air Force Funded	Mike Steffanmeyer (USACE, Omaha) 402-221-7163
9	Seal Beach Navy Weapons Station, CA See also Soil Vapor Extraction	Anaerobic	Federal Facility Naval weapons station	Soil (1,700 cy)	VOCs (BTEX), PAHs (Petroleum hydrocarbons)	Operational; Operations started in 1989	Navy/DoD Financed - IRP Program; Jacobs Engineering	Jeff Kidwell (Navy) 619-532-2058 Steve McDonald (Navy) 310-594-7655
	Naval Communication Station, Scotland,	In situ soil	Diesel fuel storage tanks and piping	Soil (quantity unknown)	SVOCs (No.2 Diesel)	Completed; Fall 1985	Nave Civil Engineering Lab/DoD Federal; Polybac	Deh Bin Chan 805-982-4191

Table 3-1
Other Federal Programs: Site-Specific Information By Innovative Treatment Technology

June 1993

Dechlorination

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
9	U. S. Public Works Center, Guam	Dechlorination	Federal Facility	Soil (5,500 cy)	PCBs	Operational; Completion planned Summer 1994	Navy; IT Corp	D.B. Chan 805-982-4191

Table 3-1
Other Federal Programs: Site-Specific Information By Innovative Treatment Technology

June 1993

Soil Vapor Extraction

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
3	Langley AFB, IRP Site 28, VA	Soil vapor extraction with air flushing	Federal Facility	Soil (quantity unknown)	VOCs (Gasoline)	Being installed; Installation completion planned Summer 1994	USACE/Air Force Funded	Tom Zink (USACE, Omaha) 402-342-6051 Dan Musell (Langley) 804-764-3987
4	Savannah River DOE, M Area Settling Basin, SC See also Bioremediation (In Situ), Other Technologies	Soil vapor extraction with air flushing with ground water sparging	Leaking solvent line	Soil (450,000 lb), Groundwater	VOCs (TCE, PCE)	Operational; Operation of the SVE system began in 1990	DOE Lead/DOE Funding; Westinghouse Savannah River Company	Nate Ellis (DOE) 803-952-4846 Brian Looney (WSRC) 803-725-5181
6	Holloman AFB, BX Service Station, NM	Soil vapor extraction may supplement with air injection	Service Station	Soil (quantity unknown)	VOCs (Benzene), PAHs (Petroleum Hydrocarbons)	In design; Design completion planned Winter 1993; Currently conducting pilot test.	USACE/Air Force IRP Program; Geraghty & Miller - Prime, Walk Haydel & Associates - Sub	Ron Stirling (USACE) 402-221-7664
6	Holloman AFB, Main POL Area, NM See also Bioremediation (In Situ), Other Technologies	Soil vapor extraction with air flushing	Former above ground fuel storage tank area (JP-4 and AV Gas spill)	Soil (quantity unknown)	VOCs (Benzene), PAHs (Petroleum Hydrocarbons)	In design; Design completion planned Fall 1993; Construction scheduled to start Fall 1993	USACE/Air Force IRP Program	Ron Stirling (USACE) 402-221-7664

Table 3-1
Other Federal Programs: Site-Specific Information By Innovative Treatment Technology

June 1993

Soil Vapor Extraction (continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
6	Kelly AFB, Site 1100*, TX See also Bioremediation (In Situ)	Soil vapor extraction	Federal Facility (hazardous waste facility)	Soil (37,000 cy)	VOCs (JP-4)	Operational; Vacuum extraction done before with bioventing, information the same.	Army (USACE)/Air Force Funded	Joe Laird (USACE, Omaha) 402-221-7772
9	Davis Monthan AFB, Site 35, AZ See also Bioremediation (In Situ)	Soil vapor extraction with bioventing	JP-4 Pump House	Soil (63,000 cy)	VOCs (JP-4, Benzene)	In design; Design completion planned Fall 1993	USACE/Air Force Funded; Montgomery Watson - Design Contractor	Mike Steffansmeier (USACE, Omaha) 402-221-7163
9	Luke AFB, AZ	Soil vapor extraction with air flushing and thermal oxidation of off gases	Air Force fire training pits	Soil (35,000 cy)	VOCs (2-hexanone, 2-butanone, 4-methyl 2-pentanone, BTEX)	Completed; Operational from 11/91 to 5/92. Will conduct long-term monitoring afterward	USACE Lead/State Oversight; Envirocon	Jerome Stolinsky (USACE) 402-221-7170 Dan McCafferty (Envirocon) 406-523-1150
9	McClellan AFB, CA	Soil vapor extraction	Former fuel and solvent disposal site	Soil (12,000 cy)	VOCs (TCE, DCE, Vinyl chloride, Toluene, Chlorobenzene)	Being installed; Installation completion planned Fall 1993; Pilot-scale test to be complete in Fall 1993	Air Force; CH2M Hill	Steve Hodge (McClellan AFB) 916-643-0830 Jerry Styles (McClellan AFB) 916-643-0533 Joseph Danko (CH2M Hill) 503-752-4271
9	Seal Beach Navy Weapons Station, CA See also Bioremediation (In Situ)	Soil vapor extraction with combustion of air emissions	Federal Facility Naval weapons station	Soil (quantity unknown)	VOCs (BTEX)	In design; Operation to start in 1994	Navy/DoD Financed - IRP Program; Jacobs Engineering	Jeff Kidwell (Navy) 619-532-2058 Steve McDonald (Navy) 310-594-7655

Table 3-1
Other Federal Programs: Site-Specific Information By Innovative Treatment Technology

June 1993

Soil Washing

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
5	Saginaw Bay Confined Disposal Facility, MI	Soil Washing	Confined disposal island	Sediments (150 cy)	PCBs	Completed; Summer 1992	COE lead/Federal Oversite; Bergmann, USA	Jim Galloway (USACE) 313-226-6760 Rick Traver (Bergmann) 202-684-6844
5	Twin Cities Army Ammunition Plant, MN	Soil Washing	Munitions manufacturing/ storage	Soil (quantity unknown)	Metals (Lead, Mercury)	Predesign; PD Completion planned Fall 1993	Federal Facility/State oversight; Wenck Associates, Inc.	Peter Rissel (US Army Env. Center) Martin McCleery (Twin Cities AAP)

Table 3-1
Other Federal Programs: Site-Specific Information By Innovative Treatment Technology

June 1993

Other

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status#	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
4	Savannah River DOE, M Area Settling Basin, SC See also Bioremediation (In Situ), Soil Vapor Extraction	air sparging	Leaking solvent line	Groundwater	VOCs (TCE, PCE)	Operational; Operational since 1990	DOE lead/DOE funding; Westinghouse Savannah River Company	Nate Ellis (DOE) 803-952-4846 Brian Looney (WSRC) 803-725-5181
6	Holloman AFB, Main POL Area, NM See also Bioremediation (In Situ), Soil Vapor Extraction	Air Sparging	Former above ground fuel storage tank area (JP-4 and AV Gas spill)	Groundwater	VOCs (Benzene), PAHs (Petroleum Hydrocarbons)	In design; Design completion planned Fall 1993; Construction scheduled to start Fall 1993	USACE/Air Force IRP Program	Ron Stirling (USACE) 402-221-7664

TABLE 3-2

**OTHER FEDERAL PROGRAMS: INNOVATIVE TREATMENT TECHNOLOGIES
BY EPA REGION**

Table 3-2 summarizes the innovative treatment technologies used at sites under other federal programs in each EPA region.

TABLE 3-2. OTHER FEDERAL PROGRAMS: INNOVATIVE TREATMENT TECHNOLOGIES
BY EPA REGION

June 1993

TECHNOLOGY	SITE NAME	STATE
<u>REGION 3</u>		
Soil Vapor Extraction	Langley AFB, IRP Site 28	VA
<u>REGION 4</u>		
Bioremediation (In situ)	Savannah River DOE, M Area Basin	SC
Soil Vapor Extraction	Savannah River DOE, M Area Basin	SC
Air Sparging	Savannah River DOE, M Area Basin	SC
<u>REGION 5</u>		
Soil Washing	Saginaw Bay Confined Disposal Facility	MI
Soil Washing	Twin Cities Army Ammunition Plant	MN
<u>REGION 6</u>		
Bioremediation (In situ)	Holloman AFB, Main POL Area	NM
Soil Vapor Extraction	Holloman AFB, BX Service Station	NM
Soil Vapor Extraction	Holloman AFB, Main POL Area	NM
Air Sparging	Holloman AFB, Main POL Area	NM
Bioremediation (Ex situ)	Matagorda Island AF Range	TX
Bioremediation (In situ)	Kelly AFB, Site 1100	TX
Soil Vapor Extraction	Kelly AFB, Site 1100	TX
<u>REGION 8</u>		
Bioremediation (In situ)	Ft. Carson	CO

TECHNOLOGY	SITE NAME	STATE
<u>REGION 8 (continued)</u>		
Bioremediation (Ex situ)	Former Glasgow AFB	MT
<u>REGION 9</u>		
Bioremediation (In situ)	Aua Fuel Farm, Aua Village, American Samoa	AZ
Bioremediation (In situ)	Davis Monthan AFB	AZ
Bioremediation (In situ)	Davis Monthan AFB, Site 35	AZ
Soil Vapor Extraction	Davis Monthan AFB, Site 35	AZ
Soil Vapor Extraction	Luke AFB	AZ
Bioremediation (Ex situ)	Ft. Ord Marina, Fritzsche AAF F	CA
Bioremediation (Ex situ)	Marine Corps., Mountain Warfare	CA
Bioremediation (In situ)	Seal Beach Navy Weapons Station	CA
Soil Vapor Extraction	McClellan AFB	CA
Soil Vapor Extraction	Seal Beach Navy Weapons Station	CA
Dechlorination	U. S. Public Works Center, Guam	GU
<u>REGION 10</u>		
Bioremediation (Ex situ)	Ft. Wainwright	AK

<u>OTHER</u>		
Bioremediation (In situ)	Naval Communication Station	Scotland

TABLE 3-3
OTHER FEDERAL PROGRAMS: PROJECT STATUS BY
INNOVATIVE TREATMENT TECHNOLOGY

Table 3-3 lists the applications of innovative treatment technologies at other federal program sites by technology and summarizes the status of the specific application. The symbols used in this table are:

- PD - In **predesign**: A site may be considered to be in predesign if EPA is negotiating the consent decree for the design with the responsible party, the lead agency is preparing the predesign report, the lead agency is contracting for the design firm, or the lead agency is conducting a treatability study or field investigation before beginning actual design work.
- D - In **design**: A site is considered to be in design after the design contractor has begun work.
- D/I - Design completed but not installed: This symbol is used if the **design** work had been completed but **installation** work has not yet begun at the time of publication of this report.
- I - **Being installed**: An innovative treatment technology is "being installed" from the time the construction contract has been awarded until the time the treatment system has begun operation. For some technologies, this is a relatively short phase of the project, because such projects are assembled quickly on site. For other technologies, the period of installation lasts several construction seasons.
- O - **Operational**: A treatment technology is operational once it has been constructed and has been proven to be functional. The length of time required to complete the operation phase depends on such factors as the nature of the technology, the quantity of material to be treated, and the concentrations of the contaminants at the start of treatment.
- C - **Completed**: A treatment technology project is considered to be completed when the operation of the treatment technology ceases. Other site activities still may be planned or underway.

TABLE 3-3. OTHER FEDERAL PROGRAMS: PROJECT STATUS BY INNOVATIVE TREATMENT TECHNOLOGY

REGION BIOREMEDIATION (EX SITU)		STATUS	REGION SOIL VAPOR EXTRACTION		STATUS
8	Former Glasgow AFB, MT	D	6	Holloman AFB, Main POL Area, NM	D
10	Ft. Wainwright, AK	I	6	Holloman AFB, BX Service Station, NM	D
6	Matagorda Island AF Range, TX	C	9	Seal Beach Navy Weapons Station, CA	D
9	Ft. Ord Marina, Fritzche AAF Fire Drill Area, CA	C	9	Davis Monthan AFB, Site 35, AZ	D
9	Marine Corps., Mountain Warfare Center, Bridgeport, CA	C	3	Langley AFB, IRP Site 28, VA	I
			9	McClellan AFB, CA	I
			4	Savannah River DOE, M Area Settling Basin, SC	O
			6	Kelly AFB, Site 1100, TX	O
			9	Luke AFB, AZ	C
REGION BIOREMEDIATION (IN SITU)		STATUS			
6	Holloman AFB, Main POL Area, NM	D	REGION SOIL WASHING		STATUS
9	Davis Monthan AFB, Site 35, AZ	D	5	Twin Cities Army Ammunition Plant, MN	-PD
8	Ft. Carson, CO	I	5	Saginaw Bay Confined Disposal Facility, MI	C
4	Savannah River DOE, M Area Settling Basin, SC	O			
6	Kelly AFB, Site 1100, TX	O	REGION OTHER		STATUS
9	Seal Beach Navy Weapons Station, CA	O	6	Holloman AFB, Main POL Area, NM	D
9	Aua Fuel Farm, Aua Village, American Samoa	O	4	Savannah River DOE, M Area Settling Basin, SC	O
9	Davis Monthan AFB, AZ	C			
	Naval Communication Station, Scotland	C			
REGION DECHLORINATION		STATUS			
9	U. S. Public Works Center, Guam, GU	O			

TABLE 3-4

OTHER FEDERAL PROGRAMS: PERFORMANCE DATA ON COMPLETED PROJECTS

Table 3-4 provides summary information on the performance and operating parameters for applications of innovative treatment technologies that have been completed at non-Superfund sites. It is intended to supplement, not replace the information included in tables 3-1, 3-2, and 3-3.

TABLE 3-4
OTHER FEDERAL PROGRAMS: PERFORMANCE DATA ON COMPLETED PROJECTS

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
5	Saginaw Bay Confined Disposal Facility, MI October 1991 to June 4, 1992 (Army)	Soil washing; Water with flocculant and surfactant as an additive Bermann USA Stafford Springs, CT	Sediment (150 cy)	PCBs	30 cy of sediment treated per day	Dredging Screening Size Reduction	Residuals were left at the facility Wastewater discharged to confined disposal facility	Forced cold-weather shut down is a limitation
6 #	Matagorda Island Af Range, TX 10/92 to 2/28/93	Ex situ bioremediation; solid phase All constructed on abandoned runway. Bacteria added and mechanically mixed. Four USTs found contamination under one UST. CCC, Inc. San Antonio, TX	Soil (500 cy)	TPH, PAHs benzene-toluene-ethylbenzene-xylene (BTEX) TPH - 3,400 ppm BTEX - 41.3 ppm Criteria: Texas water commission standards 100 ppm for TPH 30 ppm for combined BTEX	Batch process Retention time: 3 months 9 inch layers treated. Ambient temperature bacterial added to waste	Excavated approximately 40 by 60 ft area. Constructed on poly barrier and clean sand base. Did some mixing.	Backfilled the soil into the excavation	Island is now a wildlife refuge, has an endangered species.
9	Ft. Ord Marina, Fritzche AAF Fire Drill Area, CA Winter 1991 (Army)	Land farming	Soil (4,000 cy)	TCE, MEK, TPH, BTEX	Initial concentration > 1,000 ppm End concentration < 200 ppm	None	None	Gail Youngblood 408-242-8017
9	Marine Corps. Mountain Warfare Center Bridgeport, CA 8/89 to 11/89 (Navy)	Bioremediation (ex situ); heap pile bioreactor	Soil (7,000 cy)	PAHs (petroleum hydrocarbons, diesel), Metals (Lead) After 2 months of operation the TPH levels were 120 ppm		Excavation		Temperature, pressure and moisture content are monitored Bill Major (DoD) 805-982-1808

TABLE 3-4
OTHER FEDERAL PROGRAMS: PERFORMANCE DATA ON COMPLETED PROJECTS (continued)

June 1993

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
9 #	Luke AFB, AZ 11/92 to 5/9	Soil vapor extraction with air flushing and thermal oxidation of off-gases Jacobs Engineering	Soil (35,000 cy)	VOCs (2-hexanone, 2-butanone, 4-methyl 2 pentanone, BTEX) Removed approximately 11,000 lbs of vapors and 4,000 lbs of condensate	In situ down to 100 feet	None	Vapors were thermally oxidized	Total petroleum hydrocarbons were present but were too heavy to volatilize. Would recommend combining SVE with in situ bioremediation to treat contaminants that could not be extracted with the SVE.
	Naval Communication Station, Scotland February to October 1985 (Navy)	Bioremediation In situ soil, in situ ground water	Soil, Groundwater Soil quantity approximately 800 m ² in area, depth unknown	TPH (No. 2 diesel fuel)	Microorganisms function best between 20°C and 35°C.	Run-off water collected in a trench	None	The contaminated area had considerable slope, and the contaminated soil was a thin layer over a relatively impermeable rock substrate.

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Appendix A
Summary of Status Report Updates, Changes,
and Deletions

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Summary of Updates/Changes/Deletions

Each edition of this report has added new information on the applications of innovative technologies at Superfund sites and has updated the status of existing innovative projects. The information added from ROD's from previous fiscal years that was deleted, or changed in each edition (from the first edition of the report published in January 1991 through this 5th edition) is described below to allow tracking of specific projects from edition to edition.

Additions, Changes, and Deletions from the 1st edition report (January 1991) to the 2nd edition report (September 1991).

Region	Site Name, State (ROD Date)	Technology (Listed in 1st Edition)	2nd Edition			Comments	Contacts/Phone
			Added	Deleted	Changed to		
3	Leetown Pesticides, WV (03/31/86)	Bioremediation		Yes		No further action. Risk re-evaluated and was determined that risk was not sufficient for remedial action.	Andy Palestini 215-597-1286 Philip Rotstein 215-597-9023
3	Harvey-Knott Drum, DE (09/30/85)	In Situ Soil Flushing		Yes		During remedial design, sampling indicated VOCs were no longer present in the soils. Heavy metals remained at the surface. An ESD was issued on 12/92. Remedy will consist of capping the site.	Kate Lose 215-597-0910
2	SMS Instruments (Deer Park), NY (09/29/89)	Thermal Desorption		Yes (changed to soil vapor extraction in 3rd edition)		Misinterpretation of ROD during ROD analysis	Miko Fayon 212-264-4706
1	Re-Solve, MA (09/24/87)	Chemical Treatment			Dechlorination	Reclassified technology	Lorenzo Thantu 617-223-5500
2	GE Wiring Services, PR (09/30/88)	Chemical Extraction			Soil Washing	Reclassified technology	Caroline Kwan 212-264-0151
6	Sol Lynn/Industrial Transformers, TX (03/25/88)	Chemical Treatment			Dechlorination	Reclassified technology	John Meyer 214-655-6735
10	Northwest Transformer, WA (09/15/89)	In Situ Vitrification		Yes		Technology dropped because commercial availability was delayed	Christine Psyk 206-553-6519

Note: The 2nd edition report also added information on 45 innovative treatment technologies selected for remedial actions in FY 1990 RODs and 18 innovative treatment technologies used in removal actions.

Additions, Changes, and Deletions from the 2nd edition report (September 1991) to the 3rd edition report (April 1992).

Region	Site Name, State (ROD Date)	Technology (Listed in 2nd Edition)	3rd Edition			Comments	Contacts/Phone
			Added	Deleted	Changed to		
2	Marathon Battery, NY (09/30/88)	Thermal Desorption		Yes		During design soil gas concentration at hot spots was below NY state standards. GW monitoring will continue.	Pam Tames 212-264-1036
2	Goose Farm, NJ (09/27/85)	In Situ Soil Flushing		Yes		Incorrectly classified. Actually conducting pump and treat with treated water being reinjected	Laura Lombardo 212-264-6989
2	GE Wiring Services, PR (09/30/88)	Soil Washing			Thermal Desorption	Possible pre-wash of debris with surfactants	Caroline Kwan 212-264-0151
4	Coleman-Evans Wood Preserving, FL (09/26/90)	Soil Washing		Yes		Problems due to the presence of furans. Incineration likely	Tony Best 404-347-2643
5	Sangamo/Crab Orchard National Wildlife Refuge, IL (08/01/90)	In Situ Vitrification		Yes	Incineration	ROD specified the remedy as in situ vitrification <u>or</u> incineration. Incineration was chosen	Nan Gowda 312-353-9236
5	Anderson Development, MI (09/28/90)	In Situ Vitrification			Thermal Desorption	Because of concern by the community the remedy was changed. ROD amendment signed 9/30/91, and ESD was signed 10/2/92	Jim Hahnenberg 312-353-4213
5	U.S. Aviex, MI (09/07/88)	In Situ Flushing		Yes		Cleanup levels reached by natural attenuation	Robert Whippo 312-886-4759
6	Atchison/Santa Fe/Clovis, NM (09/23/88)	Bioremediation (ex situ)		Yes			Ky Nichols 214-655-6783
6	Crystal Chemical, TX (09/27/90)	In Situ Vitrification		Yes		Remedy reconsidered after delay in commercial availability of technology. Vitrification considered for hot spots only. Revised remedy will consist of capping and off-site disposal/consolidation of soils.	Lisa Price 214-655-6735

Note: The 3rd edition report also added information on 70 innovative treatment technologies selected for remedial actions in FY 1991 RODs.

Region	Site Name, State (ROD Date)	Technology (Listed in 2nd Edition)	3rd Edition			Comments	Contacts/Phone
			Added	Deleted	Changed to		
9	Solvent Service, CA (09/27/90)	Bioremediation (in situ)		Yes		ROD was misinterpreted during ROD analysis	Kevin Graves 510-286-0435 Steve Morse (CA) 570-286-0304
9	Poly Carb, NV (Removal)	Bioremediation (ex situ)			Bioremediation (in situ)	Reclassified technology	Bob Mandel 415-744-2290

Additions, Changes, and Deletions from the 3rd edition report (April 1992) to the 4th edition report (October 1992).

Region	Site Name, State (ROD Date)	Technology (Listed in 3rd Edition)	4th Edition			Comments	Contacts/Phone
			Added	Deleted	Changed to		
2	Lipari Landfill Marsh Sediment, NJ (07/11/88)	None	Thermal Desorption			Missed during original ROD analysis	Tom Graff 816-426-2296
2	GE Wiring Services PR (09/30/88)	Thermal Desorption			Soil Washing		Caroline Kwan 212-264-0151
5	University of Minnesota, MN (06/11/90)	Thermal Desorption		Yes	Incineration in 5th edition	Issued an ESD in August 1991 to change remedy to Thermal Desorption <u>or</u> Incineration. Incineration was chosen because it was less expensive	Darrel Owens 312-886-7089
6	Sol Lynn/Industrial Dechlorination Transformers, TX (03/25/88)	Dechlorination		Yes		Discontinued due to implementation difficulties	John Meyer 214-655-6735
6	Koppers/Texarkana, TX (09/23/88)	Soil Washing	In Situ Flushing			Remedy added by ROD amendment	Ursula Lennox 214-655-6735
9	Poly Carb, NV (Removal)	Bioremediation (in situ)			Bioremediation (ex situ)	Reclassified technology	Bob Mandel 415-744-2290
9	Teledyne Semiconductors, CA (03/22/91)	Soil Vapor Extraction		Yes		Mistakenly deleted from report	Sean Hogan 415-744-2233
10	Gould Battery (03/31/88)	Soil Washing	Soil Washing			Missed during original ROD analysis	Chip Humphries 503-326-2678

Note: The 4th edition report also added information on 10 innovative treatment technologies selected for remedial action in FY 1992 RODs, and 21 innovative treatment technologies at non-Superfund sites.

Additions, Changes, and Deletions from the 4th edition report (October 1992) to the 5th edition report (September 1993).

Region	Site Name, State (ROD Date)	Technology Listed in 4th Edition	5th Edition			Comments	Contacts/Phone
			Added	Deleted	Changed to		
1	Re-Solve, MA (09/24/87)	Dechlorination		Yes		Pilot study showed that dechlorination increased the volume and that the waste still needed to be incinerated. An ESD to incinerate residuals off-site is in peer review.	Joe Lemay 617-573-9622
1	Pinette's Salvage Yard, ME (05/30/89)	Solvent Extraction		Yes		Will incinerate off-site	Ross Gilleland 617-573-5766
2	Naval Air Warfare Center, OU 1, NJ (02/04/91)	In Situ Flushing		Yes		Remedy involves pump and treat with on-site discharge. Soil is not being targeted.	Jeff Gratz 212-264-6667
2	Naval Air Warfare Center, OU 2, NJ (02/04/91)	In Situ Flushing		Yes		Remedy involves pump and treat with on-site discharge. Soil is not being targeted.	Jeff Gratz 212-264-6667
2	Naval Air Warfare Center, OU 4, NJ (02/04/91)	In Situ Flushing		Yes		Remedy involves pump and treat with on-site discharge. Soil is not being targeted.	Jeff Gratz 212-264-6667
2	Caldwell Trucking, NJ (09/25/86)	Thermal Desorption		Yes		Thermal desorption not needed because highly contaminated soil will be incinerated off-site instead. Remainder will be stabilized. ESD issued.	Ed Finnerty 212-264-3555
3	Tobylanna Army Depot, PA (Non-Superfund project)	Bioremediation (in situ)		Yes		Will conduct ex situ passive volatilization	Drew Lausch 215-597-3161 Ross Mantione (Tobyhanna) 717-894-6494

Note: The 5th edition report also adds information on 49 innovative treatment technologies selected for remedial actions in FY 1992 RODs, and 15 innovative treatment technologies used in removal actions.

Additions, Changes, and Deletions from the 4th edition report (October 1992) to the 5th edition report (September 1993). (continued)

Region	Site Name, State (ROD Date)	Technology Listed in 4th Edition	5th Edition			Comments	Contacts/Phone
			Added	Deleted	Changed to		
4	Smith's Farm Brooks (09/30/91)	Dechlorination	Thermal Desorption			Will alter chemistry to achieve dechlorination during thermal desorption.	Tony DeAngelo 404-347-7791
4	American Creosote Works, FL (09/28/89)	Soil Washing		Yes		Bench-scale study of soil washing showed that the concentrations of carcinogenic PAHs were not adequately reduced. Also discovered dioxins at much higher concentrations	Mark Fite 404-347-2643
4	American Creosote Works, FL (09/28/89)	Bioremediation (Ex Situ)		Yes		Bench-scale study of bioremediation (ex situ) showed that the concentrations of carcinogenic PAHs were not adequately reduced. Also discovered dioxins at much higher concentrations	Mark Fite 404-347-2643
4	Hollingsworth Solderless, FL (04/10/86)	None	Soil Vapor Extraction			Listed as soil aeration in 3rd edition	John Zimmerman 404-347-2643
5	Cliffs/Dow Dump, MI (09/27/89)	Bioremediation (In Situ)		Yes		Bioremediation (in situ) was a misinterpretation of the ROD. All soil will be excavated and treated by bioremediation (ex situ).	Ken Glatz 312-886-1434
6	Tenth Street Dump/Junkyard, OK (09/27/90)	Dechlorination		Yes		Remedy has been suspended because of implementation difficulties and escalating cost. Cost doubled from cost projected in ROD. Issuing ROD amendment to cap in place.	Mike Overbay 214-655-8512
7	Fairfield Coal & Gas, IA (09/21/90)	Bioremediation (in situ)		Yes		Pilot study showed in situ bioremediation was too costly. It appears that the present pump and treat system will be able to achieve cleanup levels.	Bruce Morrison 913-551-7755

Additions, Changes, and Deletions from the 4th edition report (October 1992) to the 5th edition report (September 1993). (continued)

Region	Site Name, State (ROD Date)	Technology Listed in 4th Edition	5th Edition			Comments	Contacts/Phone
			Added	Deleted	Changed to		
8	Sand Creek Industrial OU 5, CO (09/28/90)	Soil Washing			Thermal Desorption	Soil washing did not meet performance standards and was expensive. ROD amendment issued early September 1993.	Erna Acheson 303-294-1971
9	Koppers Company (Oroville), CA (04/04/90)	Bioremediation (Ex Situ)		Yes		Misinterpretation of ROD during ROD analysis	Fred Schlauffler 415-744-2365
9	Signetics (AMD 901) TRW OU, CA (09/11/91)	None	Soil Vapor Extraction			Remedy added	Joe Healy 415-744-2331 Kevin Graves (CA) 510-286-0435
9	Teledyne Semiconductors, CA (09/30/91)	None	Soil Vapor Extraction			Dropped by mistake from 4th edition	Sean Hogan 415-744-2233
10	IDEL Warm Waste Pond, ID (12/05/91)	Acid Extraction		Yes		Treatability study of acid extraction did not achieve good extraction rates. Did not reduce the volume of waste. Will excavate, consolidate and cap.	Linda Meyer 206-553-6636 Nolan Jenson (DOE) 208-526-0436
10	IDEL Warm Waste Pond, ID (12/05/93)	Soil Washing		Yes		Treatability study of soil washing did not achieve results. Did not reduce the volume of waste. Will excavate, consolidate and cap.	Linda Meyer 206-553-6636 Nolan Jenson (DOE) 208-526-0436

